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Engineer Construction Planning for Operation Overlord

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THIS account of the engineer construction planning for Operation Overlord is presented, not primarily for its historical or technical interest, but rather with the thought that the experience gained and the planning methods developed may have an application in large land mass operations of the future.

Only the early phases of the Overlord planning are covered, for it is within these periods, when operational data are limited and construction requirements are only vaguely known, that the principal planning difficulties are encountered. As D-day approaches, and needs can be more definitely foreseen, many of the initial problems are automatically eliminated. Experience has indicated, however, that due to the period required for production of most construction supplies, these later refinements in the planning can be effective, only if the basic pattern of requirements has been previously established with some degree of accuracy.

It is to be noted that the term "Construction," as used here, refers only to the relatively heavy type of work accomplished by engineer units of the communications zone. The majority of such work

is, of course, performed in the communications zone itself. The necessity for close, heavy construction support of the operation, however, will often require that some activities such as railway rehabilitation or pipe-line construction be habitually pushed forward into the combat zone.

The Mission

In a land mass operation such as Overlord, construction activities usually fall into seven broad categories. These are:

1. Ports.
2. Railways.
3. Roads.
4. Pipe lines.
5. Inland waterways.
6. Utilities systems.
7. General construction, such as hospitals, shops, depots, and troop housing.

Utilizing these activities as a basis for estimating, the construction planner seeks to develop a stock pile of materials and a pool of labor, which will meet adequately all demands for construction which may arise during an operation. On the ability of a planning staff to accomplish this mission, the construction planning, and

A forecast of the troops to be supported, and the contemplated length of the operation itself, are essentials in calculating the number and type of engineer troops needed and the kind of materials required

to a large extent the logistic support of the operation, will either stand or fall.

Basic Problems

Before discussing construction planning in detail, it may be well to emphasize certain basic problems which must be resolved before any intelligent planning can be undertaken.

The first of these has to do with the time required for the production of engineer supplies. The great majority of such supplies are related in one way or another to a basic commodity used in warfare—steel. Construction requirements are thus in direct competition with many other military demands, and the time lag which this implies must be recognized. For example, in normal circumstances, the manufacture of a bulldozer may require only 1 or 2 months. Under wartime conditions, an increase in this production period to 8 or 10 months is certainly not unusual. Transportation of the bulldozer to its point of use introduces an additional delay involving, in many cases, a further 2 to 4 months. Concurrently, the time required to activate, train, and equip the necessary engineer units must be considered. It is apparent then, that to be fully effective, construction planning must be *essentially completed* a minimum of 1 year before the supplies and troops are required in the operation. This does not mean that unanticipated demands cannot be met, nor does it require that this early planning be complete to the last air compressor or final ton of steel rail. Production schedules can and will be altered, as additional intelligence and further development of operational plans may dictate. To permit these refinements, however, the *basic pattern* must have been anticipated, and production arranged well in advance of the requirement date.

The second problem involves the extent to which the engineer must be made a

party to early operational planning. The supply requirements of most services are, broadly speaking, a function of *troops* and *time*. Knowing the size of the supported force and the period for which support must be provided, a reasonably accurate forecast of requirements can be made. In estimating construction needs, however, the engineer service must deal with another all-important consideration—*terrain*.

Port or railway reconstruction, for example, cannot be planned on a purely hypothetical basis. Some knowledge of the actual ports and railroads proposed for use in the operation is essential, and the more specific this knowledge, the more accurate will be the results of the planning. The engineer, therefore, must be included early on the planning team, and he must be given the information which will permit him to estimate intelligently the construction support required for the operation. Without this information, guessing (rather than its somewhat more accurate counterpart "Guess-timating") is resorted to, with a resulting tendency toward overprovision which the civilian economy of the country may, in the future, find it difficult to accept.

Satisfactory solution of the foregoing two problems introduces a third which the engineer himself must be prepared to resolve. During the period of basic construction planning, it is extremely improbable that firm commitments can be obtained as to all of the specific ports, railways, roads, or pipe lines which will be required to support the operation. Even if this were possible, the inevitable modifications of tactical plans can be expected to cause subsequent revisions. Despite his inclusion on the planning team, therefore, the engineer must be prepared to undertake his portion of the planning on a generalized basis, using some system which will produce results compatible with the accuracy of available informa-

tion, and which will facilitate later adjustments or alterations as the planning progresses. The planning methods which were developed to meet these objectives for Operation *Overlord* will be described later. In the meantime, some discussion of the staff co-ordination which is a prerequisite to all construction planning is pertinent.

Staff Co-ordination

The departure point for any estimate of material and troop requirements must obviously be a statement of *what* is to be built (or rebuilt), within each of the categories of construction. In obtaining this information, the engineer construction planner must co-ordinate closely with many agencies.

The G4, for example, is normally charged with the responsibility for developing the over-all construction program. In theory, he receives, reviews, and consolidates the needs of all services, and formulates them into a program of installations and facilities which will be required for the support of the operation. As a practical matter, however, this responsibility for preparation of the construction program must be actively shared by the engineer. Technical personnel available to other services or to the G4 are seldom qualified to establish construction requirements, except in very broad terms. Translation of these broad statements into a specific list of installations which will accomplish the result desired by each service, and which can be built within the means available, is properly an engineer function. Co-ordination with G4 and the remaining services is, therefore, a continuing necessity.

The need for accurate information on facilities that already exist in the objective area has been mentioned. Some of this information may be available through technical channels, but the bulk of it must come from G2. In port reconstruction, as an example, water depths and

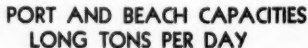
bottom conditions in enemy-held ports may completely dictate the method of reconstruction and the materials used. The extent of channel maintenance may indicate a need for expensive and elaborate dredging equipment. As D-day approaches, it will become increasingly important to know the exact preparations which have been made for the destruction of sensitive facilities such as power plants, so that reconstruction techniques or replacement parts may be planned. In this connection, the affect of our own operations cannot be neglected. Conditions which existed at the port of Le Havre, not as a result of enemy demolitions but due almost entirely to Allied air action are shown on page 10. For this essential information of the area of operations, the construction planner must work closely with G2.

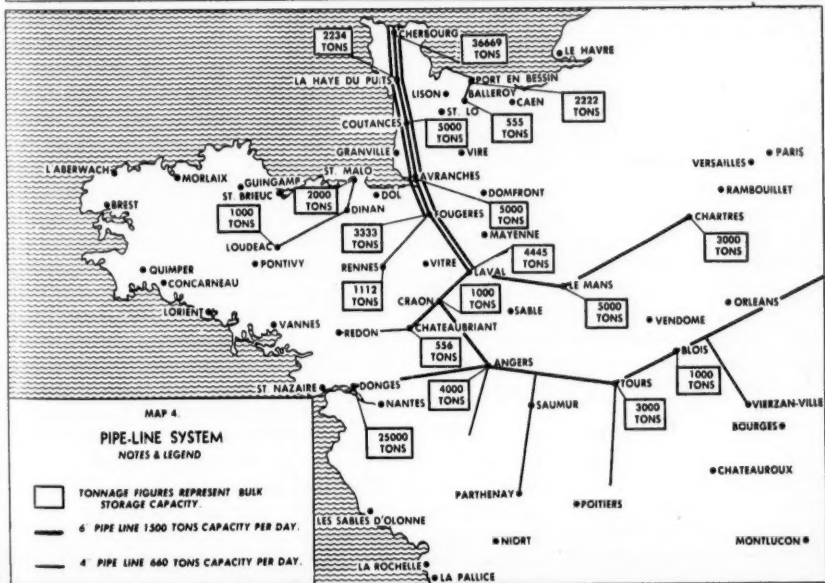
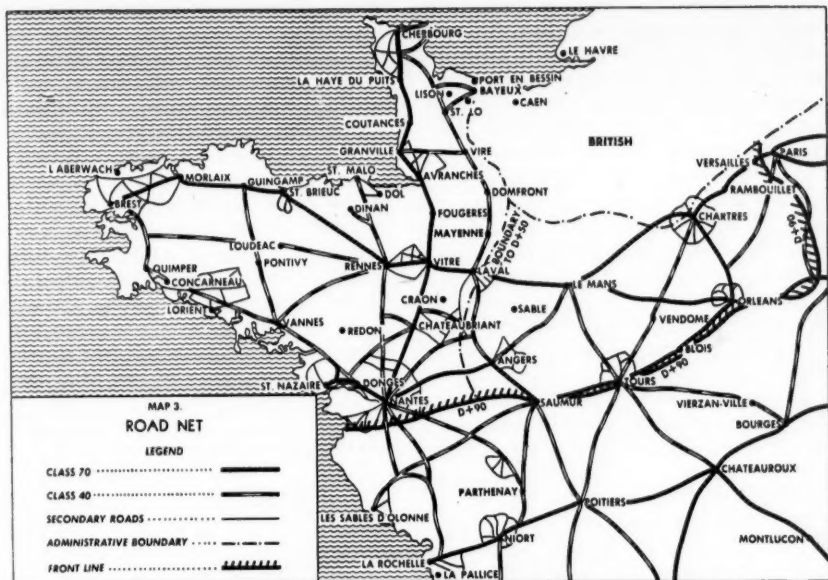
Co-ordination with G3 is equally important. The extent of the initial lodgement area will determine the number and type of engineer troops and the kind of matériel which must be landed during or shortly after the assault phase, so that the construction of high priority projects can be started. Some estimate as to the anticipated progress of the operation is also essential, in order that troops and matériel may be intelligently phased into the objective area.

The engineer construction planner, therefore, must work closely and in harmony with his principal sources of information—G2 and G3—and with his potential customers, G4 and the other services. As this co-ordination continues and needs become known with more accuracy, he may expect ultimately to develop a construction program, such as that shown in Maps 1 through 4, to be used as a basis for his detailed planning.

Detailed Planning

For reasons previously explained, the detailed construction planning of Opera-





tion *Overlord* involved a generalized rather than a specific approach. The procedure, developed after much trial and error, had as its basis a series of "Unit" estimates, prepared to cover the foreseeable types of work within each of the major categories of construction. As an example, estimates were prepared showing the labor and material required for 1 mile of railway track, 100 feet of pier reconstruction by each of several methods, 1 mile of pipe line, 1000 square feet of shop space, and for tent camps and hospitals of various standardized sizes.

For each separate type of unit, a study was made of all facilities in the objective area, to determine their suitability for military needs. Concurrently, the enemy's demolition policy, methods, and preparations were studied, and the effect of incidental combat destruction was approximated. By combining these studies, it was possible to "write-off" an estimated percentage of each type of facility, and to determine the remaining portion which could be assumed to be available for military use. Deduction of this remainder from the total number of units required for support of the operation established the net total for which materials and labor had to be provided.

The foregoing, it is to be emphasized, is a generalized description of the planning method. Each type of construction presented its own peculiar problems, which required adaptations and variations in the basic procedure. A description of how the planning was actually accomplished in several of the major construction fields may be of interest.

Ports

In case of port reconstruction, for example, unit estimates were prepared covering 41 separate methods of repairing existing piers or improvising new ones. Each method was based on the conditions and types of construction known to exist

in one or more ports in the area of operations.

Intensive studies were next undertaken to determine what preparations for demolition had been made by the enemy. Where this information was inconclusive or not available, the enemy's demolition policy was investigated through a study of his technical literature and his past operations, so that the extent of destruction could be assumed with some accuracy. "Destruction Factors," thus established, ranged as high as 75 percent for minor ports, and 90 percent for those of major importance. The end result was a "write-off" of a percentage of the total length of the existing piers in each port. The remaining length was then considered suitable for military purposes.

The construction program established port requirements in terms of phased tonnage capacity rather than pier length. These capacity figures were then converted, using an empirical rate of 1 ton of cargo per linear foot of pier per day. By deducing the estimated length of usable pier, the net total to be rebuilt in each port was determined. Selection of unit estimates representing suitable types of reconstruction, and the computation of the bill of materials and labor required, was then a comparatively simple matter.

The foregoing is, of course, a somewhat oversimplified account of the planning for port reconstruction. Many other problems were encountered which did not readily lend themselves to a generalized solution. The dredging plant required for the opening and the maintenance of entrance channels was necessarily estimated on an individual basis for each port. Methods had to be developed for removing or destroying sunken ships and other obstacles which blocked berths and approaches. Special shallow draft "port-repair" ships were designed and built to furnish floating machine shops for the maintenance of construction equipment,

and for on-the-spot fabrication of replacement parts needed for highly specialized reconstruction projects such as lock gates or power plants. The unit method of estimating, however, formed the framework for the calculation and requisition of by far the greatest tonnage of materials used in port rehabilitation.

Railways

Unit estimates for railway reconstruction were relatively simple to determine. They included data for the replacement of 1 mile of track, construction of each of the several types of railway bridges which had been adopted as standard for the operation, and the reconstruction of coaling and watering stations.

The question of enemy demolitions, on the other hand, presented some difficulties. Reports of previous operations indicated that damage to the track itself would be comparatively minor. At about the time initial railway estimates became definite, disturbing reports were received of a "track rooter" being developed by the enemy. This device, as it eventually made its appearance in the Italian operation, consisted of a heavy plow, towed slowly by a locomotive, which completely ruptured each tie at its center. As the plow passed, a block of explosive was placed automatically against the web of each rail and detonated. The resulting picture was truly a railway reconstruction man's nightmare.

The potentialities envisaged for this device were so far reaching, that estimates of track destruction at one time soared as high as 75 percent. The tonnages of reconstruction material that would be required were so staggering, that destruction factors were ultimately reduced to a comparatively conservative figure of 25 percent for main-line tracks and 35 to 50 percent for yards and sidings. In point of fact, the "track rooter" was never used by the enemy during the

Overlord operation and, as the advance progressed, an even larger percentage of original requisitions for track material was cancelled, permitting diversion of this production capacity to other military purposes. It is interesting to note, that almost until the end of the Operation, a substantial quantity of rail was carried as ballast by many cargo ships making the United States to Continent run, as insurance against the possibility that the device would make its appearance. Although planned track demolition by the enemy was, therefore, not as great as anticipated, the destruction caused by combat action still made railway rehabilitation a major problem. The results of air bombardment on a typical railway yard are shown on page 10.

Railway bridging reconstruction also presented its peculiarities, particularly with regard to determining the length and type of existing bridges. To resolve this question, aerial photographs covering several thousand miles of French railway lines were studied, and the average length of "Bridge Gap" per mile of track was determined. With known enemy preparations for demolition as a basis, destruction factors were then assumed, varying from 50 percent for comparatively short spans, up to 75 percent for major bridges. Examples of some demolitions as actually encountered are shown on page 11.

The foregoing computations were applied to the selected rail net to ascertain the extent of the reconstruction job, and unit estimates were used to compute total material and labor requirements for both track structure and bridges.

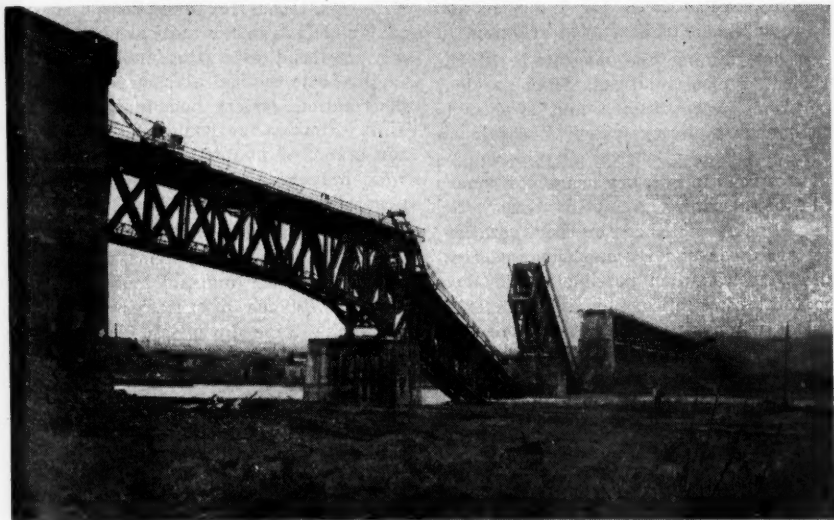
Roads

Existing road nets in the objective area were so extensive, that the road problem was early recognized to be one of maintenance rather than new construction. Unit estimates were, therefore, generally confined to the maintenance of 1 mile of



Demolitions were not always due to enemy action. Above, the destruction wrought by Allied air action at the port of Le Havre, France, is graphically illustrated. Below, the shambles created by American air attacks against railroad yards in Alençon, France, effectively delayed and harrassed German rail movements.—Department of Defense photos.





Railroad bridge reconstruction problems were complicated by the different types of bridges encountered. Above, the damage to a railroad bridge over the Meuse River at Vise, Belgium. Below, the railway bridge over the Moselle River in the vicinity of Nancy, France, reconstructed by US Army engineers.—Department of Defense photos.



road of various types for 1 month, and the replacement of destroyed bridging.

In determining the magnitude of the problem, typical road nets from previous operations were studied and applied to the French highway system to obtain an average "Road Density," expressed as miles of road in military usage per square mile of territory occupied. From the phase lines established for the Operation, the total area under occupation was computed. It was then possible to calculate the total road mileage during successive periods without the necessity of selecting specific road nets. The possibility of planned destruction of the road surface was neglected, since demolitions of this kind are not particularly remunerative in the type of terrain which exists in northern France.

Highway bridge characteristics were studied and destruction factors were assumed in the manner described for railway bridging. Similarly, total labor and material requirements were calculated using the appropriate unit estimates.

Pipe Lines

Determination of the pipe-line systems required for the distribution of liquid fuels do not readily lend themselves to a generalized solution. With the exception of bulk storage installations, which are usually in the vicinity of ports, existing facilities are generally underground and not well-suited to military needs. Other complicating factors also exist; pipe-line routes must be selected along existing road nets so that problems in the transportation and distribution of construction materials may be reduced. Terrain along the selected routes has a direct bearing on the number and frequency of pumping stations. The tactical plan and the location of logistical installations, will largely determine both the capacity of bulk storage installations and their location.

It was, therefore, found that with each major change in the tactical plan or with any material alteration in the phasing of the basic tactical plan, a new pipe-line distribution system had to be designed. Unit estimates for 1 mile of pipe line and for standard quantities of bulk storage were prepared, but their usefulness on a generalized basis was limited.

Aside from the difficulties described above, the pipe-line systems presented a number of other unusual and interesting problems. Some of these, such as the submarine pipe lines laid between the Isle of Wight (just off southern England) and the port of Cherbourg were peculiar to the *Overlord* operation, and opportunity for future use of the techniques developed will probably be limited. Another aspect, however, that of "ship-to-shore" lines during the assault phases, will undoubtedly have application in any future land mass operation. A brief description of the method used may, therefore, be warranted.

The tremendous tonnage of bulk gasoline required to support the *Overlord* operation made it mandatory that pipe-line distribution of liquid fuels be assured, even before the seizure of a major port. Experiments were accordingly conducted, both in the United States and Great Britain, to determine how underwater lines could best be laid to permit the anchorage of tankers $\frac{1}{2}$ to 1 mile off the beach to discharge their contents directly into the shoreline distribution system. The British method consisted of pulling successive lengths of rigid pipe seaward from the beach, using a small vessel with powerful winches such as a submarine net-tender. A flexible buoyed hose attached to the seaward end of the pipe permitted direct discharge of tankers into the system. This method, due to its inherent simplicity, was ultimately adopted and successfully employed by both British and United States forces.

Its use, during the early stages of *Overlord*, substantially reduced the tonnage moving over assault beaches and contributed materially to the logistic support of the Operation.

Inland Waterways

Application of the unit estimating method to inland waterways was not found to be entirely practicable. The network of canals throughout northeast France and Belgium is extensive, but the complete lack of any standardization in construction made it difficult to arrive at any kind of standardized solution. In addition, it was apparent that, except for lock structures, reconstruction would be largely an earth-moving job requiring principally the type of equipment organic to engineer construction units.

In the repair of locks and lock gates, reconstruction materials were considered to present only a minor problem, in comparison with other types of work, and it was felt that their reconstruction could be accomplished by improvised methods, using materials available locally.

The validity of these assumptions was proved during the Operation. Although a substantial amount of inland waterway work was undertaken, exclusion of this type of construction from the basic planning did not seriously affect accomplishment of any such projects.

Utilities Systems

It was established early in the planning, that the rehabilitation of utilities systems would be undertaken only insofar as it was necessary for the accomplishment of military objectives, or to prevent the spreading of disease and unrest among the civilian population.

Purely military requirements were not of major concern, since self-contained utilities were provided for all new camps and hospitals included in the construction program. The extent of the civilian

problem, however, was difficult to estimate. The field for demolition was fertile, and the ability of civilian agencies to effect repairs was largely a matter of conjecture.

Eventually, however, it was decided to adapt the unit estimating concept in a more or less token method of solving the problem. Population statistics and per capita figures on the consumption of water and electric power were gathered; at the same time, minimum standards for civilian use were established. Concurrently, the characteristics of existing utility systems and the probable extent of enemy demolitions were investigated.

From these studies it was possible to establish over-all criteria for the rehabilitation of utilities systems, and to prepare unit estimates showing the minimum essential supplies required per 1,000,000 population in the occupied area. Based on the civilian population ascertained as of any date, phased requirements were then determined.

General Construction

In the field of general construction, unit estimating probably found its principal and easiest application. Once the required number of installations was known, and this total had been reduced by the extent to which existing facilities were assumed to be usable, then computation of the total bill of materials and labor was largely mechanical. Since the approach was generally similar to that used for other types of construction, no further description is necessary.

Results of the Planning

The final stock pile of construction materials as planned to carry the Operation through D plus 240 amounted to the staggering total of 1,300,000 tons, or about 5400 tons per day. This total excluded bulk materials, such as sand and gravel, which it was known could be obtained

locally. In point of fact, the full total of the stock pile was never procured, since changes in plans as the operation developed permitted cancellation of many requirements. The ultimate total of materials consumed, however, exclusive of bulk materials procured locally, was well in excess of 1,000,000 tons.

Labor estimates indicated that approx-

imately 56 engineer general service regiments (or their equivalent in construction battalions) would be required to complete the planned construction program. Troop ceilings, subsequently imposed, prevented this full total from being reached, but prisoners of war and civilians were used to meet the deficiencies with generally satisfactory results.

In modern war, the whole economic structure of society is promptly involved. A gigantic military force, backed by a weakened economic and industrial system, would not have the long-run stamina and resources required in a global war. The heart of the problem, therefore, is to find the balance point between an effective military striking force and the reservoir of men, machinery, and morale that always must stand behind that force.

Officers' Call

The Convening Authority And His Staff Judge Advocate

Major Kenneth J. Hodson, JAGC

THE rapid expansion of the Army after 1941 resulted in the necessarily rapid promotion of many officers for assignment to high command positions. A large number of these commanders, despite a scant prior experience in the administration of military justice, suddenly found themselves empowered to convene general courts-martial—courts which could, and in a number of cases did, adjudge the death penalty. Each of these commanders found on his staff a staff judge advocate. To many of these commanders who were empowered to convene general courts-martial (exclusive of the Air Force units, there were more than 600 in all), having a lawyer on the staff was a completely new experience. What was his mission? What were his functions? How did he go about performing whatever duties he was to perform? The Army publications list itemized hundreds of texts containing detailed instructions on almost every conceivable subject. Yet, other than for a few short sentences in various publications indicating that the staff judge advocate was the legal adviser of the commander on whose staff he was serving,

there was little information on the subject of the powers and responsibilities of an officer exercising general court-martial jurisdiction, or as to the manner in which a staff judge advocate was to assist such a commander. *The Manual for Courts-Martial, 1928*, contained the law on the subject, but the details as to the parts played by the commander and his staff judge advocate generally were dictated by custom, the experience of the commander, and the ability and personality of the staff judge advocate.

After the War, as after all other wars, criticism from a variety of sources was leveled at the Army because of the manner in which military justice had been administered during World War II. A committee of eminent lawyers and jurists was appointed by the Secretary of War to report on the manner in which military justice had been administered and, if appropriate, to make recommendations for improvement. This committee found that although some of the criticism was justified, most of it was entirely without foundation. Among the faults found were these: There was too much command influ-

The Army believes it has always led in the proper administration of military justice; it must stay in the lead. However, the Army must make its system of justice fair and impartial, as well as effective

ence; there was insufficient or improper utilization of legally trained personnel. The committee made certain recommendations for improvement in the system. These recommendations played an important part in the subsequent enactment by Congress of the 1948 Articles of War (AW), which established the system of justice that has been in effect in the Army since February 1949. In order to establish one system of justice for all the armed forces, Congress in 1950 enacted the Uniform Code of Military Justice (UCMJ). This code, which is to become effective on 31 May 1951, incorporates many of the important features of the 1948 Articles of War.

The purpose of this article is to outline briefly the relationship between the commander who is empowered to convene general courts-martial—who will be referred to as the GCM authority—and his staff judge advocate. It will be limited to matters related to the administration of military justice. A proper understanding of this relationship necessitates a discussion of some of the powers and responsibilities, as well as some of the problems, of the GCM authority and his staff judge advocate. As the Uniform Code of Military Justice will make no substantial change in the present powers, duties, and responsibilities of the GCM authority, the discussion is, in general, applicable under both the 1948 Articles of War and the Uniform Code of Military Justice. No attempt will be made to discuss in detail all the varied questions of substantive law and procedure which may arise in the administration of justice in the Army. Such matters are now to be found in the *Manual for Courts-Martial, 1949*, and with respect to the uniform code, will be found in the new *Manual for Courts-Martial for the Armed Forces*, which is now being prepared in the office of The Judge Advocate General.

Responsibility of the GCM Authority

The GCM authority is responsible for the proper administration of justice throughout his entire command. His general responsibility in this regard begins with his assumption of command, and ends when he is relieved of command. As to a particular case, his responsibility begins when an offense is committed by a member of his unit, or, if he has an area command, when an offense is committed in his area by a person subject to trial by Army courts-martial—whether that person is a member of the GCM authority's unit or not.

The administration of military justice is just as much a responsibility of command as is the supply or training of troops. The GCM authority must take action to ensure that his command is properly organized, that his subordinate commanders are fully qualified to perform their duties, are fully aware of their military justice responsibilities, and that they carry out such responsibilities in an orderly and expeditious manner.

As a part of his responsibility for the proper administration of military justice throughout his command, the GCM authority has certain judicial responsibilities. These involve the appointment of courts-martial, the reference of proper charges to such courts for trial, the review of the record of trials of such courts, and the examination—for errors, defects, or omissions—of records of trials by summary and special courts-martial which are forwarded to him by his subordinate commanders.

Status and General Functions of the Staff Judge Advocate

The staff judge advocate is the legal adviser of the GCM authority. Congress recognized the administration of justice to be of great importance to the mission of the Army, and sought to ensure that commanders responsible therefor would

have direct access to the best available legal advice. Both the 1948 Articles of War and the Uniform Code of Military Justice contain the provision that GCM authorities will "communicate directly with their staff judge advocate in matters relating to the administration of military justice"; and both authorize the staff judge advocate "to communicate directly with the staff judge advocate of a superior or subordinate command, or with The Judge Advocate General." In effect, the

responsibilities which apply to all officers in the normal chain of command in the Army.

A staff judge advocate acts in the capacity of a Government legal adviser. The legal advice furnished by the staff judge advocate to the GCM authority is in the nature of a privileged communication between attorney and client. The GCM authority may accept or reject his advice and his recommendations, or he may request the advice of The Judge Advocate Gen-



At his request, an accused soldier will be tried by a court of at least one-third enlisted personnel. Here, enlisted members of a court being sworn in.—US Air Force photo.

staff judge advocate has a dual role. He performs his duties on behalf of his commander, but under the technical and professional supervision of The Judge Advocate General; with respect to the administration of military justice, he works in close co-operation with his commander and with the staff judge advocates of other commands to ensure that justice is properly administered. However, he is a member of the commander's special staff and is subject to the usual obligations and

eral. The staff judge advocate, although a specialist in the field of military law, cannot change the law or waive any of its requirements. He can only interpret it to the best of his ability. Each of his decisions with respect to the administration of military justice must be a judicious determination of the rights of both the Government and the accused. Legal questions are not always free from doubt, but the staff judge advocate, in determining what advice and recommendations he

shall give his GCM authority, will adhere to the opinions of The Judge Advocate General, whenever they are applicable.

As the staff judge advocate is a staff officer, his decisions must be made in the name of the GCM authority. Throughout this article it is suggested that various functions of the GCM authority can be performed by the staff judge advocate, in keeping with the general policies of, but without in each instance conferring with, the GCM authority. The extent to which the commander permits his staff judge advocate to perform such functions in the manner suggested will depend largely upon the confidence he places in the ability of the judge advocate. In general, to ensure the expeditious disposition of court-martial cases, as well as to free himself from the mass of administrative detail connected with the exercise of court-martial jurisdiction, the GCM authority may authorize his staff judge advocate to take final action in every matter except those requiring the personal signature of the GCM authority, or when the question involves a deviation from the GCM authority's policy.

Aspects of Command Responsibility

The GCM authority is responsible for the orderly and expeditious disposition of military justice matters which arise in his command. Several attributes of command will aid him in fulfilling his responsibility in this regard. The assistance and advice of his staff judge advocate will be an important key to his success.

The GCM authority should take appropriate action to assure the success of an effective military justice training program. Practical and effective training can be carried out by an on-the-job training program. At one of his earliest meetings with his subordinate unit commanders, the GCM authority should emphasize the importance of selecting properly qualified members of the command for appointment

to general courts-martial and for the performance of other military justice duties; he should stress the importance of ensuring that each eligible person in the command gain some first-hand experience in the performance of military justice duties. Subordinate commanders who submit names of personnel for appointment to courts-martial sometimes withhold their key personnel and submit the names of those personnel who "can be spared" for such duties. This is a poor policy, as it invariably results in a few officers performing all military justice duties, while other officers may never have the opportunity to gain needed experience in this field. The fact that the personnel whose names are withheld are key personnel is all the more reason why they should gain as much experience as possible in the administration of military justice—they will probably be exercising their own court-martial jurisdiction in the near future.

In a tactical unit, such as an infantry division (not usually having an area responsibility), few problems arise with respect to the responsibility for the processing and disposition of court-martial charges, as the responsibilities of subordinate unit commanders and the command channels are well defined and fairly stable. When a GCM authority is assigned an area command, he may discover that certain detached units in his area are not under the command of any subordinate commander exercising special court-martial jurisdiction (the latter commander is referred to in this article as the SCM authority). He may also find that no local SCM authority is responsible for the exercise of court-martial jurisdiction with respect to military offenders who are not members of the GCM authority's command, but who commit offenses in certain areas of his command. If he is to ensure an orderly and expeditious disposition of military justice matters, the GCM authority must take ap-

appropriate administrative action to make certain that:

1. Each person in his command, except the members of his own staff and the SCM authorities themselves, are under a particular SCM authority for the administration of military justice.

2. A particular SCM authority in each area of his command is made responsible for the exercise of court-martial jurisdiction over military offenders who are not members of the GCM authority's command, but who commit offenses in that area.

3. Each SCM authority is fully aware of the area over which, and the persons over whom, it is his responsibility to exercise special court-martial jurisdiction.

Some of the problems involved in the organization of his command for the efficient administration of military justice are discussed in the following three paragraphs.

A GCM authority may reserve to himself the power to appoint summary or special courts-martial in his command. He should not exercise this power except under unusual circumstances. Exercise of the power prevents subordinate commanders from discharging one of their important command functions. In addition, there are practical reasons why the commander should not reserve to himself the power to exercise special and summary court-martial jurisdiction. For example, the strength of his staff judge advocate section generally is based on the assumption that the GCM authority will appoint general courts-martial *only*. Similarly, as the GCM authority ordinarily must look to a subordinate commander for the personnel to perform the duties of investigating officers, counsel, and members of courts, he should assign to such a subordinate commander the responsibility for the handling of the entire case.

A superior authority may effect a partial reservation of the power of a sub-

ordinate commander to appoint courts-martial. For example, the GCM authority of an overseas command might deem it necessary, because of an unusual local situation, to require that all charges involving offenses of violence against civilians be forwarded (with the recommendations of the subordinate commander as to disposition) to his headquarters prior to trial or other disposition. The fact that the GCM authority has reserved to himself the right to dispose of such charges does not mean that they must be tried by a court-martial appointed by him. He may, after reviewing the charges and the expected evidence, dismiss the charges, punish the offender under the provisions of AW 104 (Article 15, UCMJ), refer the charges to a court-martial appointed by him, or return the charges to the subordinate commander for *appropriate disposition*. Under no circumstances should he return such charges to the subordinate commander, authorize the latter to act as appointing authority, and, at the same time, direct him to dispose of the charges in a prescribed manner. Such action would amount to a usurpation of the judicial powers of the subordinate commander as appointing and reviewing authority.

A group of detached units which are not under any single subordinate commander may be placed under a single commander for the purpose of authorizing the latter to appoint special or summary courts-martial for the trial of proper cases arising in any of the units. For example, a group of detached units stationed near the headquarters of a GCM authority could be placed under the command of the senior officer commanding one of the detachments for the sole purpose of permitting that officer to exercise special court-martial jurisdiction over all the units. The detached units could be placed under the command of any officer (including a staff officer) who is authorized to command

troops, although such an officer might not have any other command functions at the time. The officer designated to exercise special court-martial jurisdiction over several detached units should be authorized to appoint personnel of the various units as pretrial investigating officers, and as members and counsel of the courts. He should also be provided with sufficient administrative personnel to enable him to carry out his additional duties promptly and properly.

Although, with few exceptions (AW 92; none under the UCMJ), the place of commission of an offense does not affect the jurisdiction of a court-martial, the GCM authority who has an area command will be faced, from time to time, with problems relating to the disposition of military offenders—not members of his command—who commit offenses in his area. The GCM authority legally may exercise jurisdiction over such an offender. The question in each case is whether he should do so. Superior authority may have prescribed the manner in which such cases are to be handled; otherwise, comity arrangements between the responsible GCM authorities will prevail. For example, if an accused from a unit located at a substantial distance from the place of the offense is charged with speeding, he probably should be tried by a local summary court-martial since the administrative problems inherent in preparing and forwarding the necessary documents to his unit—plus the travel of the necessary witnesses, or the taking of their dispositions—may make it impractical for his own unit to bring him to trial. If an accused from a unit located at a substantial distance from the place of the offense is charged with a serious offense, and it appears that one or more civilian witnesses are necessary to prove the offense, it probably will be in the best interests of the service and the accused that he be tried locally, so that both he and the prosecu-

tion may have full opportunity to have the necessary witnesses present at the pretrial investigation and at the trial. Normally, the accused's GCM authority will concur in the requested disposition of the case. In the event of disagreement between GCM authorities as to which is to assume jurisdiction in a particular case, the matter should be referred to superior authority for decision.

The GCM authority must be sure that accused are not confined, in his command, for unreasonable periods of time, (1) without having charges preferred, and (2) without trial. Unless reports required by superior authority provide him with the necessary information, the GCM authority may decide, after conferring with his staff judge advocate and other interested staff officers, that a special report should be made with respect to all persons held in confinement in his command. For example, he might require that:

1. A report be made by the prison officer, through the responsible SCM authority, whenever any person is held in confinement more than 7 days without charges having been preferred, giving the reasons therefor.

2. A report be made by the prison officer, through the responsible SCM authority, whenever a person is held in confinement more than 20 days without trial, giving the reasons therefor.

Normally, these reports will be transmitted to the staff judge advocate for necessary action and further report to the GCM authority. The latter should give the staff judge advocate broad powers to determine whether the confinement in each case is reasonable and, when appropriate, to take action to have the accused released therefrom.

3. A special report to be made by the nearest SCM authority or other proper officer—using the most expeditious means available—when grave offenses are discovered, such as riots, mutinies, murders,

rapes, and particularly reprehensible and violent crimes against members of civil communities.

The proper preparation and submission of such reports will prevent the GCM authority from learning, for the first time from a perusal of newspaper headlines, that an unusually grave crime has been committed or that an accused in his command has been held in confinement for an excessive period.

Functions of the Commander as GCM Appointing Authority

If the command is properly organized and the personnel well trained, almost all court-martial charges received at the headquarters of the GCM authority will have originated in a subordinate unit of the command. They will have been investigated under the provisions of AW 46 (Article 32, UCMJ), and will have been examined and forwarded by an SCM authority with an appropriate recommendation as to disposition.

Both the 1948 Articles of War and the Uniform Code of Military Justice provide that charges must be referred to the staff judge advocate for advice, before the GCM authority may refer them to a general court-martial for trial. It is not necessary that the staff judge advocate confer personally with the GCM authority with respect to every phase of the processing of every court-martial charge. The GCM authority has a right to expect, and should demand, complete staff action from his staff judge advocate; that is, that all necessary preliminary matters will have been disposed of before a case is presented to him for action. It is not feasible to list all the preliminary actions which might be taken by the staff judge advocate in all cases, but the following are some examples: Having the charges investigated under AW 46; having a further formal or informal investigation conducted to resolve a conflict in the evidence;

redrafting the charges to allege a more serious or essentially different offense for the signature of a new accuser, and reference of the redrafted charges to the SCM authority for a new investigation under AW 46; arranging for an examination of the accused's mental condition; and correcting obvious errors and redrafting the charges.

When the charges are ready for the action of the GCM authority, the staff judge advocate should confer personally with him, if such action is necessary, to determine their disposition. After he knows the policy of the GCM authority with respect to any particular line of cases, it should not be necessary for the staff judge advocate to get the GCM authority's personal approval before disposing of such cases. This is an action which the staff judge advocate can and should take himself. The staff judge advocate and the GCM authority usually will establish a standing operating procedure with respect to those military justice matters which the GCM authority wishes brought to his personal attention. In a typical command, this standing operating procedure, reduced to writing and addressed by the GCM authority to his staff judge advocate, might read substantially as follows:

"1. The following court-martial charges will be brought to my personal attention before reference to trial:

- a. Those involving women personnel.
- b. Those involving officer personnel.
- c. Those which have already received publicity in the press or on the radio or which, because of the personnel involved, the nature of the offense, or any other unusual features, are likely to receive publicity.
- d. Those which you believe should be referred to a court-martial for a trial from which the public will be excluded.
- e. Those involving any unusual ques-

tion of law or policy which you believe should be brought to my attention.

"2. Action by way of reference for trial or other disposition may be taken by you on all other cases without my personal approval, but if the file shows a serious malfunctioning of command, the matter will be brought to my immediate attention."

When charges are ready for action by the GCM authority, and it appears to the staff judge advocate that trial by general court-martial is warranted, he will prepare a written advice in a form recommended by The Judge Advocate General. It will include a written and signed statement as to the staff judge advocate's findings with respect to whether a proper investigation of the charges has been made, the legal sufficiency of the charge, whether the charge is sustained by evidence indicated in the report of investigation, and a specific recommendation for trial by general court-martial. If, under the standing operating procedure, the case is one that is to be brought to the attention of the GCM authority, the staff judge advocate will normally carry the charges and allied papers to the GCM authority, give him a concise report and recommendation, and thereafter carry the commander's decision into effect.

The staff judge advocate may determine, as a result of his examination of the charges, that they should be referred to an inferior court for trial, disposed of under AW 104 (Article 15, UCMJ), dismissed, or forwarded to another GCM jurisdiction for action. In such a case, although he may do so, he need not prepare a formal written advice. He will prepare the action that will effect his recommendation; for example, if he recommends punishment under AW 104 (Article 15, UCMJ), he will prepare a letter for the GCM authority's signature, notifying the accused of the intended imposition of punishment.

In determining what disposition to make of court-martial charges, the GCM authority should not attempt to follow any hard and fast rules. Each case presented to him should be judged on its own facts. For example, he should not determine that all cases involving absence without leave in excess of a certain number of days should be referred to a general court-martial. Disposition of such cases should include consideration of the prior record of the accused, the reasons for his absentsing himself, and, frequently, his attitude toward the service.

Functions of the Commander as GCM Reviewing Authority

Both the 1948 Articles of War and the Uniform Code of Military Justice provide that, before acting upon a record of trial by general court-martial and, in certain cases, a record of trial by special court-martial, the GCM authority must refer it to his staff judge advocate for review and advice.

Before presenting the case to the GCM authority for his action, the staff judge advocate will take necessary preliminary steps to ensure that the record of trial is complete and correct, that all conflicts which can be resolved have been resolved, and that the record is ready in all respects for final action. When necessary or appropriate he may, for example, obtain certificates of correction, direct action in revision, or cause the accused to be brought before a board of medical officers for the purpose of determining his sanity. If the staff judge advocate has decided to recommend disapproval of the sentence, he will, when appropriate, cause an inquiry to be made to determine whether a rehearing would be practicable under all the known circumstances.

The staff judge advocate must advise the GCM authority what sentence is legally sustained by the record. If the staff judge advocate finds that any part of the

sentence is legally sustained, he will next consider whether the legally sustained sentence should be approved in whole or in part and, as approved, ordered executed, or whether, as approved, it should be mitigated, or the execution of the whole or a part of it suspended.

A record of trial occasionally will indicate improper or irregular behavior on the part of personnel other than the accused. For example, the record may show that the military policemen who arrested the accused failed to advise him of his rights against self-incrimination before they questioned him concerning the alleged offense; that a medical officer to whom the accused was taken for treatment, apparently failed to give the accused proper treatment. The staff judge advocate should bring such irregularities to the attention of the appropriate staff officer, the chief of staff, or the commander, depending upon the standing operating procedure for such intra-headquarters matters.

After examining the record of trial and taking the necessary preliminary action to complete and correct the record so that it is ready for the action of the GCM authority, the staff judge advocate will prepare a written review of the record of trial. The review will include his opinion as to the adequacy and weight of the evidence, the effect of any error or irregularity respecting the proceedings, and a specific recommendation as to the action to be taken. Reasons for both the opinions and the recommendation will be stated.

The record of trial, together with the review of the staff judge advocate and the action which he recommends, normally are presented personally to the GCM authority by the staff judge advocate. The GCM authority need not read the record of trial or the entire review; he may require a concise oral report and recommendation, or he may desire to discuss the case at length. He may be convinced that the ac-

tion recommended is proper, and may sign the recommended action forthwith. He may, however, decide to read the entire review and, perhaps, even the record of trial itself before taking action. He is not required to accept the opinion and recommendation of the staff judge advocate. As the initial reviewing authority, he may take such action as he deems legal and appropriate. Normally, he should accept the staff judge advocate's advice on such questions as to the legal sufficiency of the evidence to sustain the findings of guilty, the effect of errors on the proceedings, and the legality of the sentence.

If the GCM authority disagrees with the staff judge advocate as to whether a conviction of an offense is established beyond reasonable doubt, he should transmit the record of trial, with an expression of his own views and the opinion of the staff judge advocate, to The Judge Advocate General for advice.

Although the GCM authority normally should follow his staff judge advocate's advice with respect to the legal sufficiency of the evidence to sustain a finding of guilty of an offense, it is within his particular province to weigh evidence, judge the credibility of witnesses, and determine controverted questions of fact that may have been raised in the record.

The question of what sentence can legally be approved is one of law and should be left to the staff judge advocate to determine. The question of what legal sentence *should* be approved is one as to which the GCM authority may exercise his own discretion, remembering, however, that the advice of the staff judge advocate is based on specialized training and experience, as well as Department of the Army policy. If he believes the sentence, though legal, is too severe, or is not appropriate under all the circumstances, and that the sentence is divisible, he should approve only so much of it as he believes

to be proper. He should not approve all legal sentences as a matter of course; he should not rely upon higher authority to reduce the sentence to such limits as may be proper under the circumstances of the case; nor should he attempt to follow any predetermined rule as to exactly what sentence will be approved and ordered executed in certain kinds of cases. For example, the GCM authority should not adopt a hard and fast policy of suspending the execution of punitive discharges in all cases involving conviction of military offenses, and of executing all punitive discharges in cases involving conviction of nonmilitary offenses; each case should be judged on its own facts. If he believes a legal sentence should be mitigated or remitted, or that the execution of a sentence should be suspended, he should feel free to take appropriate action to modify the approved sentence if he has the power to do so. If the court adjudged a death sentence and the GCM authority believes that sentence to be too severe, he is not empowered to commute the sentence, but he should, in an accompanying letter to The Judge Advocate General, recommend commutation to an appropriate period of imprisonment, giving his reasons for such a recommendation. As GCM authority, he has broad powers with respect to determining what sentence the accused shall be required to serve. He should give careful consideration to the proper exercise of those powers in every case.

The GCM authority's action is prepared by the staff judge advocate; it must be signed personally by the GCM authority. If the action recommended by the staff judge advocate is not adopted, the staff judge advocate will prepare a new action in accordance with the expressed desires of the GCM authority. In such a case, the staff judge advocate will insert a note on the last page of his review explaining that the action taken was as prescribed by the GCM authority. Other-

wise, appellate agencies may be in doubt as to whether the staff judge advocate had inadvertently presented an unintended action for signature.

Having taken his action on a particular record of trial, the GCM authority ordinarily will not be concerned with the nature of the further appellate review thereof. However, he should be aware of the fact that all records of trials by general courts-martial and some records of trials by special courts-martial are forwarded to the office of The Judge Advocate General for further appellate review. Under the 1948 Articles of War, appellate review of a record of trial is completely automatic, and the accused is not entitled to counsel furnished by the Government. Under the Uniform Code of Military Justice, the appellate review of a record will be automatic in part. However, in many cases the accused will have the right to be represented, during the appellate review, by counsel furnished by the Government and may appeal to the Court of Military Appeals. This latter tribunal, a new concept in the administration of military justice, is to be composed of three civilian judges appointed by the President.

Functions of the GCM Authority with Respect to Review of Inferior Courts-Martial Records

The GCM authority has supervisory powers over special and summary courts-martial convened by his subordinate commanders. The full performance of these powers is usually delegated to the staff judge advocate.

Each record of trial by special or summary court-martial is transmitted to the GCM authority. When received, it is referred to the office of the staff judge advocate where it is examined. If errors, defects, or omissions are found which require corrective action, the staff judge advocate will inform the commander who acted as reviewing authority on the rec-

ord, giving him specific directions as to the corrective action he must take.

In the examination of records of trials by inferior courts-martial, the staff judge advocate normally is concerned only with determining the legality of the sentence. He usually is not concerned with the question of whether the sentence, although within legal limits, is appropriate, as that is primarily a matter for determination by the SCM authority. However, if the sentence adjudged and approved in a particular case is completely out-of-line with sentences adjudged and approved in similar cases in the command, or if the sentences approved by a particular subordinate commander are consistently more severe than those approved in other similar cases in the command, the staff judge advocate may bring this fact to the attention of the GCM authority.

Conclusion

This article contains but a brief sketch of the problems which will confront the GCM authority and his staff judge advocate as they carry out their duties with respect to the administration of justice in their command. It should be apparent, however, that such duties will involve, from time to time, complicated and technical questions of procedural and substantive law. The manner in which they perform their duties is subject to the scrutiny of appellate agencies, including,

under the Uniform Code of Military Justice, a review by a civilian tribunal. Congress, recognizing that prompt and, in appropriate cases, stern justice best serves the ends of a successful Army, entrusted the initial review of court-martial cases to the military commander. It did not contemplate that the commander would be trained in the law, or that he would have more than a reasonable comprehension of the legal questions that might be involved. Accordingly, Congress furnished the GCM authority with a lawyer, in order that he might receive such legal advice as might be necessary to enable him to carry out his military justice duties properly.

Vast strides have been made in recent years in the administration of justice in many States and in the Federal jurisdiction. The Army believes it has always led in the proper administration of criminal justice. It must stay in the lead. However, whether in the lead or not, the Army should make its system of justice fair and impartial, as well as effective. The burden of achieving fair, impartial, and effective justice depends to a large extent upon the manner in which the officer exercising general court-martial jurisdiction and his staff judge advocate perform their duties. They must work together in complete harmony and understanding if they are to perform these duties with distinction.

Man can sustain no heavier spiritual blow than the thought that his life or death is of no consequence. Too often has the conviction that the individual is of no importance led the soldier to the collateral belief that his individual effort is of no importance either. If this thought is generated in enough men in an Army, the end result in battle is obvious. Therefore, we strive to build an officer corps that will recognize, honor, and preserve the dignity and identity of the humblest soldier. At the same time, we use every device available to us to convince the soldier himself that his well-being, his aspirations, his service are all matters of prime importance to his Army and to his country. We seek to fulfill the desire in every human heart to count for something, to be needed.

Brigadier General C. T. Lanham

Preparation of a Map Exercise

Lieutenant Colonel Dean M. Benson, *Artillery*, and
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FIELD exercises and maneuvers provide the best means for training officers in high command and staff duties. However, to train the number of officers required for such duties upon the outbreak of a war, other methods must be employed to supplement field training.

In the Army school system, the application of military doctrine to simulate specific situations is an important part of the educational program. The value derived from this method of training varies directly with the realism with which conditions of actual war are simulated.

The method of instruction is a means to an end. It is the device which facilitates student learning. The method of instruction used in each case must be that which will achieve best the objectives of the particular instructional matter to be presented. Of the various types of applicatory exercises, the map exercise is the most effective type for presenting command and general staff principles, doctrine, and procedures in the classroom. As all officers will probably be required to prepare and present a map exercise at some time during their career, a discussion of the technique of preparing this instructional device is pertinent.

The Map Exercise

A map exercise is that medium of instruction in which a military situation, depicted on a map, is used as the basis

for learning. The situation is normally developed progressively, with related requirements for students to solve by realistic participation as a commander or staff officer. Staff groups may be designated for solving purposes. After the requirements have been solved, the solutions are corrected and returned to students, or are discussed in general conference.

The map exercise affords realistic training, particularly in planning operations. Any terrain in the world for which maps exist may be used. Artificialities often encountered in peacetime field training, such as private property restrictions, safety zones, or understrength units, are avoided. Since students are not required to leave the classroom, training time is conserved, even though the effectiveness of the map exercise will depend, in part, on the time, effort, and materials expended in its preparation and presentation. However, the map exercise does not permit the inclusion of such realistic factors as the actual time, space, weather, terrain, and enemy action portrayed. Only a limited opportunity is provided to introduce problems that arise from human relationships and mechanical failures. Thus an academic attitude in the handling of troops may develop.

The Directive

The planning and direction of military instruction is a function of command.

Map exercises are initiated by a written or oral directive issued by appropriate authority. The directive is assigned to an author who is responsible for preparing the instruction. A directive may contain any or all of the following:

1. Purpose, scope, and duration of the exercise.
2. Nature of advance study assignment.
3. Size of forces involved.
4. Tactical principles or fundamentals to be stressed.
5. Features of the tactical situation to be used.
6. Maps to be used.
7. Place, date, and time at which the exercise is to be conducted.
8. Personnel to participate in the exercise.
9. Pertinent aspects of co-ordination,

curriculum. If no written directive is provided by higher authority, the author should prepare a directive, based on the oral instructions of that authority.

An example of a directive, issued at the Command and General Staff College, is shown as Figure 1 on page 29.

Cycle of Preparation

The cycle of preparation for the author consists of five interrelated steps or tasks. The author must:

First, acquire broad background information on the subject concerned.

Second, develop a general plan for preparing and presenting the map exercise. This development culminates in the *outline plan* of the map exercise.

Third, develop in final form the necessary materials for issue to the student

Realism is the keystone around which productive military teaching is based. The map exercise, applicatory in nature, is one of the most effective and practical methods of inducing realism in the classroom

specific basic texts to be used as reference material, and date for review prior to final publication.

Information contained in the directive must be sufficiently clear and detailed to enable the author to prepare the exercise as intended by the directing authority. The *purpose* may be stated in general terms: "To illustrate the fundamentals of the offensive." It may be stated more specifically, for example, "to illustrate the fundamentals and techniques involved in planning a night attack by an infantry division." The *scope* may specify that the exercise illustrate certain principles and techniques, to ensure inclusion of the more important aspects of an operation; or it may guide the author by indicating what decisions, plans, and orders should be developed during conduct of the exercise. The scope is usually limited for purposes of maintaining continuity in a

such as maps; advance sheet, including study assignment and supplemental material if needed; the necessary requirements, solutions, and discussion sheets if appropriate; and situations, both general and special.

Fourth, plan and prepare instructional aids and classroom facilities to be used during presentation.

Fifth, develop in final form the instructor's lesson plan for conducting instruction.

The first and second tasks are concerned primarily with research and planning. These two operations—research and planning—are generally carried out concurrently, hence they are considered as a single aspect in the preparation of a map exercise. Accomplishment of the other three tasks will originate, in outline form, during initial stages of plan-

ning, but will be developed throughout the process of preparation. In sequence of final accomplishment, the end results of the above tasks are the seven items listed in Figure 2 on page 31.

These seven items represent the basic product of an author's work. Though listed in sequence of final completion, the items are interdependent. In subsequent paragraphs the method of arriving at each of the items will be described.

Research and Planning

Preparation of instructional material is based on thorough planning and research. Planning will, in fact, include research which will, in turn, shape or modify the over-all plan.

The estimate.—Every plan should be developed from an estimate of the situation; planning for the preparation of a map exercise is no exception. The author's estimate is essentially that of the commander or staff officer in any military situation:

1. Mission.—An analysis of the purpose of the directive to determine what the student is to learn from the instruction.

2. Situation.—A consideration of the factors, favorable and unfavorable, which will influence the choice of a course of action, such as:

- a. Preceding and subsequent instruction.

- b. Time allotted for presentation, and the general method of instruction directed.

- c. Preparation time and deadlines to be met.

- d. Materials available for instruction.

- e. Map area prescribed or available.

3. Courses of action.—The different learning methods which can implement the desired instruction, and the different teaching techniques which might be employed.

4. Comparison of courses of action.—An analysis of the courses of action in

view of the situation, to determine the most effective plan to be adopted.

5. Decision.—The outline plan for the instruction to be presented.

As with any continuing situation, it will be necessary to review and revise this estimate as the preparation proceeds. Initial decisions which form the basis for preparing the map exercise may have to be modified as the exercise takes shape.

Analysis of the directive.—As shown in the discussion of the estimate, the first step in research and planning is to gain a clear understanding of the mission to be accomplished. To ensure complete understanding of his problem, the author must analyze his directive carefully. It is essential that he fix firmly in mind, the purpose of the map exercise and the tactical principles and fundamentals to be illustrated. If any implied tasks are indicated in the directive, he must clarify them with the proper authority, to save time and effort.

Backward planning.—To amplify the understanding of the mission to be accomplished, a backward planning approach is recommended. The major instructional fields for student learning are determined from the directive. Within the scope of these major instructional fields, the author must develop the more detailed instructional points for student learning, points that the student is expected to retain. Without a clear concept of the instructional points to be taught, the author has no sound basis for preparation of the instruction.

Research.—Research performed by the author may be described as the systematic collection, evaluation, interpretation, and organization of facts relating to the instruction to be prepared. The author conducts his research, both to familiarize himself fully with the subject, and to prepare materials for issue to the class. Since most military instruction is based on the established doctrine of the Armed

COMMAND AND GENERAL STAFF COLLEGE
Fort Leavenworth, Kansas

DIRECTIVE¹

Subject No 5305/1

Type: ME Hours: 4 Date issued: 1 Apr 51

School assignment: Academic Division Phase: II

Present to: Regular 23 Oct 51
(Class) (Date)

TITLE OF SUBJECT²: Infantry Division Operations

PURPOSE: By means of a map exercise, develop the application of the tactical fundamentals involved in the organization and defense of a position by an interior infantry division of a corps.

SCOPE AND GENERAL METHOD OF PRESENTATION:

1. Advance study.—*a.* The material issued in advance will include the corps operation order complete in the portions pertinent to the division played.

b. In advance study assignment, require student—

(1) To study the terrain in the sector of division employment.

(2) To determine as the first requirement the number of regiments to be employed on the main line of resistance and to indicate the general location of infantry battalion defense areas within the regimental positions. The preferred solution is to be two regiments abreast.

2. Class Application.—*a.* Initial period.—Introduction and discussion of the first requirement. (25 min)

b. Security forces.—Cover the location and composition of forces for the outpost line of resistance and the combat outposts. (35 min)

c. Division reserve.—Include (1) Location and composition of the division reserve. (2) Blocking positions to be prepared by the reserve, and (3) A counterattack plan for an assumed enemy penetration in the division sector. (70 min)

d. Conduct of the defense.—(1) A requirement illustrating the method of employment of security forces on the OPLR. (25 min)

(2) A requirement for the division commander to make a decision to employ his reserve in a counterattack role as planned previously. (25 min)

e. Summary.—By means of questions provided in the Lesson Plan, have instructor conduct discussion period that will bring out how fundamentals of defense were applied in the exercise. (20 min)

3. Map.—PENNSYLVANIA, 1:50,000 NEW HOLLAND—LANCASTER, will be used.

SUBJECTS WITH WHICH COORDINATION IS REQUIRED³:

Subject No
5015 (1950-51)
5302 (1950-51)

Title
Fundamentals of the Defense
Operation Orders

REFERENCES⁴:

Reference No
FM 100-5
FM 101-5

Title
Operations
Staff Organization and Procedure

REVIEW: Type: Formal

Number of days prior to presentation: (See Schedule)

¹ Each paragraph of this directive should be complete in every respect. If no entry is required, enter "None."

² This title must be identical with the title shown for this subject on the Master Schedule Board.

³ Include only those subjects which are to be presented during the current school year.

⁴ Include the title as well as the reference number of any text, document, or College subject.

Figure 1.

Forces, the author's first source for research material is currently available texts, Field Manuals, Technical Manuals, Tables of Organization and Equipment, and Training Circulars. Once satisfied with the approved doctrine to be followed, the author must utilize every available source of material which may assist him in his preparation. These sources may include:

1. Previous and related units of instruction.
2. Libraries, unit histories, service journals, and semiofficial publications.
3. Other officers qualified to offer expert or pertinent advice in their respective fields, to include foreign army representatives.
4. Personal visits and field trips to obtain information of other installations, agencies, or activities, when appropriate.

The importance of systematic research cannot be overemphasized. Without a planned approach, the author will follow irrelevant leads and waste time. To guide his research effort properly, the author should adopt methods which will promote selective and thorough research appropriate to the purpose and scope of his directive. A recommended method is a research outline based on the plan developed in the estimate. This outline of topics and subtopics, complete with a card filing system on which to record data as obtained, will provide a guide for completeness of research.

Developing the Plan

As research of the subject nears completion, the outline plan for the map exercise is developed, based on that determined earlier in the estimate. Finalization of this plan will result from a continuing estimate of the situation. The following matters will require particular attention.

Selection of material.—Though research will have been done selectively and

thoroughly, nevertheless, a careful review of the collected material will usually be necessary. The objective of this review is to eliminate material which has been discovered, by later references, to be out-of-date; to consolidate repetitious material; and to discard information deemed irrelevant in the light of revised plans for the exercise.

Outline plan.—The outline plan is the author's concept (decision) of what specific points the student is to learn (or apply), and the method of student participation to be used. The total time devoted to classroom instruction is broken down into major time blocks. Each block must be adequate to develop and teach the instructional points to be presented in that period. The time comprising each block may be shown on the margin of the outline, to include a further subdivision within each time block for applicatory work and a discussion period.

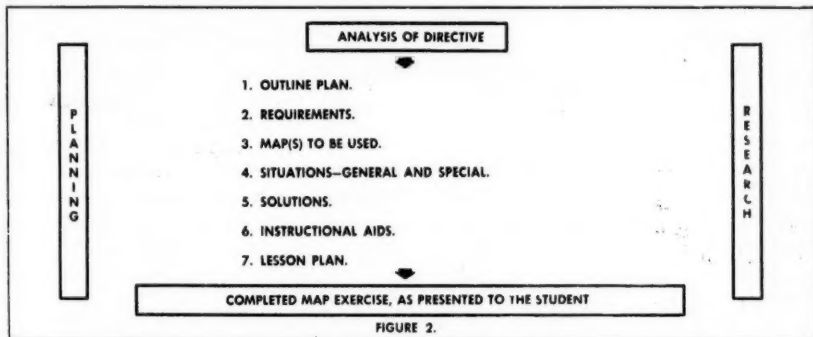
How the student will be taught is best indicated by showing:

1. The study assignment, to include the major subjects to be studied or reviewed, and the practical work or other advance work to be performed.
2. The role (commander or staff officer) played by the student and a brief description of the work performed to develop the instructional points included in a particular time block. Any specific features that will have to be portrayed by the tactical situation, in order to develop the instructional points, are also noted.

The most accurate approach for ensuring that the student does arrive at the goal indicated by the instructional points is to decide, at this point, how the student is to participate in the problem. Student participation is based on the instructional points which he is to learn. The author should ask himself: "What am I going to require the student to do which will cause him to learn?" The question can be answered, initially, without a

specific situation in mind. This follows a form of "backward planning," whereby situations are built on the basis of the requirements to be solved. Initially, it is necessary only to decide upon, and to outline, the general pattern of work to be accomplished by the student. For example, if a directive prescribes learning the control and co-ordinating measures used in an infantry division attack, the author will have listed the instructional points to be stressed. For one particular major time block, he might have grouped the points involved in designating zones of action and lines of departure. Thus, the

The outline plan, therefore, is developed from an analysis of the directive and the determination of the instructional points. It takes shape in the author's estimate, as augmented by further research. The courses of action include various methods of presenting the instructional points in combination with maps to be used, the over-all tactical situation, and time allocations. After a comparative analysis of various plans in the light of influencing conditions, the author determines the most effective plan to be adopted. His decision is expressed as the



author might determine at this time that: "The student will participate as G3, submitting on an overlay his recommendations for zones of action and line of departure. One regiment, already in contact, will use the line of contact for its line of departure. The other assault regiment will use a well-defined terrain feature for its line of departure." The exact wording of the requirement which will induce the end result desired, and the writing of the situation which will provide the basis for the student solution, will come later. In short, the general pattern of student participation for learning all of the instructional points must be determined, before any specific situations are developed.

outline plan, which is the basis for the preparation of the map exercise.

Maps.—An examination will have been made of possible terrain or map areas based on the author's initial estimate. Final selection will be made to complete the plan. Choice of suitable maps, or "ground," for the situation to be portrayed involves four considerations:

1. Suitable terrain features.—This will apply to the most obvious features, such as a river for river crossing instructions; as well as to less apparent ones such as soil trafficability for armored operations. In studying the terrain, the author must have his "story" for the map exercise in mind. He should visualize how his final troop dispositions can be located

on the terrain represented by the map. It is also important that the map be suitable to portray events leading up to the final situation without necessitating the introduction of forced or unreal conditions.

2. Proper scale.—The map area must be of sufficient size to portray the operation contemplated, and yet, must be of adequate scale to show the detail necessary for terrain analysis. It may be necessary to use two maps of different scale to accomplish these purposes.

3. Available map coverage.—If the desired map or sufficient copies are not available, prompt steps to obtain them should be taken.

4. Restrictions.—Exact areas will be prescribed, when it is necessary that the map exercise fit into a phase of instruction portraying a sequence of operations. The directive may indicate the specific map to be used.

Situations.—A general and one or more special situations are usually required to "set the stage" for student participation in a map exercise. The general situation may be defined as the minimum background information necessary for understanding and interpreting one or more special situations. The special situation is defined as a statement of the essential background information necessary to appraise correctly the factors bearing on a given requirement. It is important that the author adapt situations to the requirements, rather than requirements to the situations. If developed otherwise, there is a strong tendency to "build" the requirements to fit the situation, instead of bringing out desired instructional points. Clarity and brevity are essential in writing the situation. However, in this phase of the preparation, the more important considerations are completeness and continuity of detail. The situations must contain all factors which are neces-

sary for consideration in arriving at the desired solution.

Study assignments.—Here the author must ask himself: "What is the student to do to assist in his learning?" In this case, the analysis of the question is directed specifically at *study*, that is, acquiring background knowledge prior to attendance in the classroom. This is determined by an analysis along the following lines:

1. In view of the purpose of the map exercise, what does the student need to know?

2. What knowledge can the student be expected to have acquired from previous instruction?

3. What learning is to take place solely in the classroom?

4. What remains for the student to acquire prior to class time?

This process will result in the scheduling of minimum study assignments. Any practical work that must be completed prior to class time must be considered as part of his study assignment, as well as any requirement for the student to review or read material that will furnish a broader background. Specifically, the study assignment must be so designed as to provide a background for the subject prior to the student's attendance in class. In no case should the assignment be "padded," merely to fill up allotted study time.

Review of plans and material.—The final phase of planning, prior to beginning the detailed preparation, is an informal review of the author's plan by the directing authority, if appropriate. This review is an assurance that the plan will accomplish the purpose of the directive within the method and scope prescribed. The following should be done:

1. Check for understanding and interpretation of the directive.

2. Check the outline of the exercise, with particular attention to the break-

down of time and method of presentation.

3. Review the "story" of the exercise and the terrain of the area to be used for adequacy.

4. Check draft requirements for completeness and accuracy.

5. Check assignment and study ques-

phase, which will continue as necessary throughout the processes discussed.

Requirements.—Realism is of paramount importance to a good requirement. Whether it is one of tactical decision, of strategic planning, or of staff work, the requirement should involve the solution



While preparing a map exercise, the author consults with other instructors to ensure that it is realistic, concise, understandable, and applies approved doctrine correctly.

tions, particularly for pertinency and continuity with other instruction.

Preparing the Instructional Material

The third task in the cycle of writing a map exercise is the detailed preparation of materials for issue to the class, based on the principles applicable in preparing requirements, situations, and assignments. The steps outlined are initiated in the planning and research

of realistic problems. Several appropriate subjects for requirements in a realistic sequence of action are:

1. Estimates or the analysis of factors to be considered in arriving at a decision.
2. Development and analysis of plans including long-range and alternate plans, or portions thereof.
3. Preparation of instructions and orders, or portions thereof.
4. Requests of subordinate units for

modifications in plans, orders, and instructions.

5. Action and orders of commanders and staff officers in the execution of plans and orders.

6. Co-ordination within a staff and between commanders.

Requirements which bring out the need for co-ordination, and the ways to achieve it, are most effective. The correct wording of a requirement involves considerable thought, skill, and practice. The requirement must be specific as to what is wanted. The meaning must be clear, so that the student can understand it quickly without becoming confused by excess wordage. For purposes of realism, the wording must be in the present tense. It is important to remember that requirements are drafted and written on the basis of instructional points to be taught, prior to completing the situation(s).

Situations.—Writing a concise, yet comprehensive and realistic situation, is difficult. It must tell a realistic "story" with essential details, and yet not distract or mislead the student with excess or irrelevant information. For example, the background history of an infantry division since its arrival in a theater of operations is realistic, but only in unusual cases would such information be necessary for the division commander to decide whether or not he will employ the tank battalion 6 months later. Quite often, situations can be described realistically, using complete or extract orders, estimates, or reports that normally occur in combat.

The situation must do more than present a complete set of facts from which a solution may be deduced. It must indicate the status of variable influencing factors, in the light of which military principles are applied. The most commonly used variables are:

1. Mission.—The mission is properly the predominant variable. The use of a

specific mission, in connection with other variables, enables the author to create almost any situation desired. Students must learn to meet any situation which confronts them so as to achieve the primary objective—accomplishment of the mission.

2. Strength.—Portraying the enemy as being inferior or stronger in manpower, firepower, or matériel is ordinarily interpreted as favoring aggressive or passive action by friendly forces. In order to create a thought-provoking situation, combat superiority should seldom result from numerical strength as the single decisive factor. Other factors must be presented to counteract or balance the strength factor, and thus require a realistic determination of combat power.

3. Morale.—It is desirable, from a standpoint of realism, to portray accurately the state of morale of the unit(s) being described. Unfortunately it is difficult to do this. When the purpose of the instruction is to teach how to evaluate the effect of morale, the situation must present facts which bear on morale, and the student must be required to deduce their effect.

4. Composition and disposition of forces.—Either one or both of these factors may be so portrayed as to justify a line of action that would not be possible otherwise. A superiority in friendly artillery, for example, may justify attacking an enemy who is equally strong in other respects. Similarly, a weaker force, mobile and prepared for combat, may make a successful attack against a larger force disposed in an unfavorable formation or position. Other variables such as terrain and weather are closely related to these factors.

5. Reinforcements.—The location of a second force or a reserve, and information upon which to estimate the time when this force can enter the battle, is a factor

frequently used to influence a decision to be made.

6. Terrain.—Terrain is a very important factor. Observation, cover, troop movements, installations, and transportation are all affected by terrain. Unnatural assumptions regarding terrain must be avoided. Terrain best suited to the type operation envisaged must be selected. The selection of a suitable map of the proper scale assists the student in visualizing the terrain to be used in the map exercise.

7. Time and space.—Distance, as an element of time and space, enters into most of the variables already described. Obviously, distance must be considered in connection with rates of movement, hence, time. The amount of available daylight or darkness is a factor that can be used to create a desired situation.

8. Logistical considerations.—In modern war, the status and continuity of logistical support (supply, evacuation and hospitalization, transportation, and service) determines, in large measure, the effectiveness of any military force. Consideration of this fact is implied in variables already discussed, particularly strength and composition of forces, terrain, and time and space. These factors must, therefore, be applied with an appreciation of their corresponding effect on logistical support. Additionally, the over-all logistical situation presents a variable which the author can cause to become critical in a tactical situation.

9. Weather.—The importance of weather in modern war is axiomatic. This factor should always be introduced into tactical exercises, particularly as it enters into air operations, observation, and ground mobility. In some cases, weather should be made decisive so that its consideration will become habitual.

Solutions.—The author in his preparation of a map exercise is expected to provide solutions to the problems he has

created. This is best accomplished by placing himself in the position of the student, and solving the requirements he has written. He must then check his solutions against the instructional points he intended to develop. If the instructional points are developed in the solutions, he can consider his requirements sound. If not, he must revise the requirements, or his original estimate of what is to be taught during that particular period. It is advisable to recheck the results by having a colleague solve the requirements. This will assist in determining that the requirements are clearly stated, and the solutions are appropriate and sound.

Study assignment.—The author is expected to assign references in standard available texts. Supplementary study material in advance sheets is justified only when the material is widely scattered in published texts, or not otherwise available. Cognizance must be taken of previous work done by the students, and references that have been recently or frequently used should not be repeated. The time required by the average student to complete the study assignment and any practical work at home must be carefully estimated. For example, at the Command and General Staff College, the total study time must not exceed 40 minutes per classroom hour.

The final phase in development of the study assignment is the explanation to the class of what must be studied. No two cases will be alike, hence, no fixed rules as to how to indicate the study assignment can be prescribed. As a desirable technique, the assignment is stated in order of doing for the particular lesson.

Instructional Aids

The fourth task in the author's cycle of preparation is planning and preparing the instructional aids and classroom facilities. The function of an instructional aid is to assist in clarifying an element of

learning; it is not intended to replace the instructor. When the instruction is given in small classes, elaborate aids are not usually required. Both students and instructors can use the issued materials. The author must always consider the following factors before adopting the use of instructional aids: appropriateness; economy of time and effort; clarity of meaning; and method of use. The method of use must be determined in terms of meaningfulness to the student, in relation to the learning that he is to accomplish. Complete directions for the use of instructional aids must be included in the lesson plan.

The Lesson Plan

The last major task in the cycle of preparing a map exercise is preparation of the lesson plan in its final form. The lesson plan has its origin in the author's first estimate and plan. It continues to develop, at least in the author's mind, as the exercise itself takes shape. Early in the development of the lesson plan, the author must include adequate periods for his introductory remarks, subsummaries, and conclusions. Instructions in the lesson plan guide the instructor, as necessary, to promote learning by the student. Many aspects of the lesson plan can be progressively improved, until its final publication about a week prior to presentation.

The lesson plan provides the comprehensive plan for conducting the instruction. In addition to fulfilling that purpose, it provides:

1. A means by which the instruction may be conducted by one who is unfamiliar with the original study and research involved in preparing the subject.
2. A means for ensuring a uniform presentation of the instruction to more than one class or group of students.

The form of the lesson plan will vary because of differences in subject matter and learning methods employed. Also, individual authors necessarily introduce

variations to suit their particular needs.

In preparing a lesson plan, the outline plan is expanded into a scenario which covers all of the details of conducting the instruction. Normally, the following material is included:

1. A chronological schedule of the time allotment for each phase of instruction. It appears at the left of the page with lines dividing the time blocks so that they stand out.

2. An outline description of essential phases which require oral presentation by the instructor, such as:

- a. Initial introduction or transitions to introduce successive requirements.

- b. Instructions for applicatory work by the class.

- c. Summaries and subsummaries.

3. The mechanics of conducting the instruction, such as notes regarding the issue and collection of materials, and details regarding instructional aids.

4. Solutions to formal requirements for which no written solution is otherwise issued, as well as answers to discussion questions or topics which are to be used in developing the desired solution in the classroom. These solutions and answers are best expressed in telegraphic style—*succinct wording, short sentences*—for an instructor's use in his own manner of expression.

5. Alternate or additional discussion topics, questions, or historic or schematic examples to be developed as time permits.

6. Hints on classroom technique, such as warnings to the instructor as to contingencies that might arise and how to meet them, or anticipated questions and suggested ways to answer them.

7. Any other information which might prove helpful in clarifying the intent of instruction.

Techniques

The map exercise is applicatory in nature. The author must be constantly aware of this fact, and so his planning

must be aimed at "student learning by doing," rather than by reading or listening. The inherent nature of the map exercise requires the presentation of a realistic situation. The author must not portray an unreal situation directed at only limited aspects of a problem. For example, if only one general staff section is to be stressed in the map exercise, a narrative explanation of the related interests of the other general staff sections should be issued to the students to induce the feeling of realism and completeness. Completeness in this sense, however, must not be confused with complexity. If the author follows the procedure of determining requirements prior to developing the situation, he can construct a complete, yet concise, and purposeful exercise with little danger of departing from his directive. A further element of realism is achieved by constructing a logical sequence of events. The practice is never to sacrifice realism, in order to achieve a temporary interest in the problem.

The application of influencing factors in the situations is the essence of building a good map exercise. Other procedures of invaluable assistance are to:

1. Use historical records and portions of other map exercises that have proved to be valid instructional material.

2. Simplify the instructional materials. A voluminous issue of material is not by itself an indication of a good problem. Points to observe in preparing these materials are:

- a. Do not issue a separate map for the general situation unless it is essential to its understanding. Classroom charts will often serve the same purpose.

- b. Avoid duplication of map issue, as students may have a previous issue of the same map which they can use.

- c. Consolidate materials on overlays when possible. Eliminate numerous overlays describing unimportant changes.

- d. Avoid the duplication of charts and

forms which exist in standard reference texts.

- e. Do not issue solution overlays or maps when the solution is simple enough to be indicated on a classroom chart, or by classroom discussion. In some cases, the solution can be included in the section containing the next requirement, especially if the "school solution" is necessary for uniformity of work.

3. Strive for clarity and brevity. This requires the careful selection of words, and construction of sentences. Check with qualified individuals to ensure that their interpretation of what has been written is that which was intended. If other interpretations can be made, the wording in question is probably faulty. Avoid the use of technical terms of doubtful clarity.

4. Avoid crowding. Do not present more than five major points of fundamental doctrine in 1 hour. Build on existing student knowledge.

Form

The basic consideration as to form for the publication of a map exercise is that of facilitating student understanding and solving. The form currently used at the Command and General Staff College accomplishes this purpose, and is described below.

The general situation is customarily stated in paragraph 1 of Section I. It includes a list of the maps required or to be issued with the problem. Following this is the information which provides the solver with a general orientation for the opening situation. Pertinent facts known or assumed to be known to friendly and hostile forces, to include as a minimum the mission or status of the next higher friendly force(s), should be mentioned. The fundamental rule is that the general situation must be clear, brief, and contain no extraneous information.

Special situations are found in para-

graph 2 of Section I, or as the opening paragraphs of subsequent sections.

Requirements are written as separate paragraphs immediately following each special situation.

Overlays are numbered consecutively in order of use. The legend of each overlay includes a designation of the applicable map, and the requirement or section to which the overlay pertains. When more than one overlay is used on the same map, it is desirable to indicate the same set of grid intersections for the orientation of each overlay.

Completion Details

There are other problems with which the author of a map exercise is concerned in order to complete his instructional unit. These problems of an administrative and co-ordinating nature are subject to local custom and procedure for solution. Hence, only brief mention of these problems is made here to complete the picture of preparing a map exercise. The author is usually responsible for the following matters:

1. Co-ordination with other authors.—This co-ordination may be necessary to ensure continuity of instruction throughout a series of exercises in a curriculum,

or for integrating the work of contributing authors.

2. Review boards.—As prescribed by the directing authority, the author must submit his map exercise to a review board for approval, prior to final publication. This involves the completion of a sufficient number of copies prior to the review, and any subsequent modification of the map exercise as directed by the board.

3. Publication.—This involves the preparation of job requisitions and work orders, and proofreading the copy prior to its being printed.

4. Presentation details.—This includes the preparation of classroom issue plans, arrangement of classrooms, briefing other instructors, and ensuring the execution of these matters.

5. After-action reports.—The purpose of an after-action report is to record for future use the recommendations and modifications which have developed from the presentation of the map exercise to the class. The report covers all aspects of the presentation, including comments on the adequacy of instruction and correctness of doctrine. The report is submitted with complete copies of all material related to the exercise to the directing authority upon the completion of the instruction.

Realism of maneuver training expresses itself in the rigors of living in the field, the competitive element of the war game and the immediate tactical situation. Large-scale troop representation brings into play all types of units and all of the specialized and auxiliary functions common to a modern fighting force.

General Mark W. Clark

Ammunition Supply in the Battle for Brest

Dr. Roland G. Ruppenthal

Office, Chief of Military History, Department of the Army

This article is excerpted from a chapter of Dr. Ruppenthal's forthcoming book entitled: Logistical Support of the Armies, one of the volumes in the series The U.S. Army in World War II, now being prepared by the Office of the Chief of Military History, Department of the Army. Copyright 1952 by Orlando Ward; permission for reproduction may be obtained on request from the Chief of Military History, The Pentagon, Washington 25, D.C.—The Editor.

MOST widely advertised of all the supply shortages which thwarted the operations of American forces during the pursuit across northern France in the summer of 1944 was the shortage of gasoline. While the advance of the First and Third Armies lost momentum along the German border and the Moselle, however, an equally exasperating shortage of another sort had developed in an all but forgotten action involving the VIII Corps under Maj. Gen. Troy H. Middleton, some 450 miles to the rear, in Brittany.

The inability to move sufficient ammunition to the Brittany area produced one of the most frustrating situations experienced during the entire course of opera-

tions in the European Theater in 1944-1945. The story of the ammunition shortage at Brest provides a case study rewarding in its lessons in military supply. It reveals not only the normal difficulty of satisfying even the minimum requirements in a period when the logistic organization is over-taxed by the pressure of pursuit operations, but also how the effect of physical limitations is aggravated by faulty administrative procedure, poor communications, and by lack of clearly defined responsibility and follow-through in the execution of orders.

Importance of Brittany Peninsula

No other feature of the *Overlord* invasion plan had had greater importance than the capture of the Brittany Peninsula. The restoration and use of its ports had been deemed vital to the build-up and support of United States forces on the Continent, and the seizure of this area had been given a priority second only to the capture of the Cotentin with its port of Cherbourg. The break-out from Normandy at the end of July by no means altered the importance of the Brittany area. In contrast with earlier plans for its capture, however, General Bradley decided, early in August, to exploit the enemy's desperate

Effective combat depends, in part, on adequate logistic support. Plans for this support must be complete, flexible, co-ordinated, and issued to all interested agencies before the operation begins

situation at the time by directing the bulk of the Third Army's forces eastward toward the Seine, and leaving the capture of Brittany to a single corps. The ensuing two-directional pursuit soon placed an unbearable strain on transportation resources, and resulted in critical supply shortages which had a decided bearing on the conduct of operations in Brittany, as well as east of the Seine. As the lines of communication extended into the Peninsula, the VIII Corps, like the units racing eastward, suffered shortages in all classes of supply. Artillery battalions, for example, were reported unable to move out of danger when taken under fire because of the lack of gasoline. In view of the siege type of operations which the VIII Corps was soon forced to undertake against such fortified places as St. Malo and Brest, lack of ammunition rather than gasoline soon became the severest limiting factor.

Inadequate Logistic Support

Shortages of artillery ammunition had already begun to hamper the Corps on 6 August, when the attacks on St. Malo were initiated. Enemy strength there had been greatly underestimated by the Third Army staff (the citadel held out for 10 days), and inadequate allocations forced severe curtailment of the fire plans. For several days, some of the heavy corps artillery battalions were reduced to expenditures of 4 rounds per gun per day. With this experience in mind, Corps warned Army as early as 10 August of the heavy ammunition demands anticipated for the reduction of Brest. A week later, at the invitation of Colonel Walter J. Muller (the Army G4), the VIII Corps G4, Colonel Gainer B. Jones, and the Corps Ordnance Officer, Colonel John S. Walker, drove to the Army Command Post (CP) near Le Mans and submitted more formal estimates of the Corps ammunition requirements for the Brest operation. They asked that 3 units of fire be laid down prior to the at-

tack, and that five additional units be set up for delivery for the first 3 days of the attack. Translated into tonnages, this request called for an initial stockage of 8,700 tons, plus maintenance requirements totaling 11,600 tons for the first 3 days. These estimates were based on the expenditure experience at St. Malo and on the expected employment of 1 armored and 3 infantry divisions, and 13 battalions of corps field artillery. The Third Army Ordnance Officer, Colonel Thomas H. Nixon, refused to approve the Corps request for these amounts, insisting that they were excessive. First of all, he noted that the Corps had been misinformed as to the number of troops it would have for the operation, since only 2 divisions and 10 corps artillery battalions would be allotted. (Actually, 3 infantry divisions, a separate task force, and 18 corps artillery battalions were employed in the attack on Brest.) Second, Army believed that Corps had overestimated the strength of the enemy garrison at Brest. Despite the experience at St. Malo, Army believed that Brest would surrender after a show of force, and set 1 September as the target date for completion of the mission. To the dismay of the Corps staff, the Army allotted only about 5,000 tons of ammunition for the operation, the bulk of which was already laid down in ammunition supply points (ASPs) in the vicinity of Pontorson and Dinan, near St. Malo.

The VIII Corps supply position was by this time beginning to suffer the adverse effects of a rapidly changing tactical situation. The bulk of the Third Army was now engaged in the eastward drive, with a portion of the command about to cross the Seine. While General Patton was still vitally concerned with the Army's mission in Brittany, it was natural that the main attention of the Army should be concentrated on the pursuit, and it was becoming apparent that the Third Army was not willing to divert a large portion of its

meager logistic support to an operation which had definitely become subsidiary to, or at least far removed from, the main effort. The control and support of the Brittany operation, furthermore, was daily becoming more difficult because of the increasing distance between the headquarters involved. On 17 August, the day on which the Corps supply officers met with members of the Army staff, the Army headquarters was already in the vicinity of Le Mans, 100 air miles from the Corps CP near St. Malo. Within a few days, the two headquarters were 270 miles apart, the Third Army having moved eastward to the vicinity of Chartres, and VIII Corps to the northwestern tip of Brittany.

At the meeting of 17 August, Colonel Muller, the Army G4, called attention to the increasing difficulty of handling the supply of the Brittany forces, in view of the great distance between the Army and the Corps, and informed the Corps officers that the Brittany Base Section was being organized with headquarters at Rennes to provide administrative support for the Corps. Whatever the Army's intentions may have been in this respect, the VIII Corps staff, either from what it was told at this meeting or within a day of two after, concluded that it was from then on to look to the Brittany Base Section for supply support, and that it had been granted authority to deal directly with the new base section on such matters. At any rate, on 20 or 21 August, to meet the requirements of its troop basis—which had been augmented beyond that on which Army had based its allowances—and to meet the requests of the Corps Artillery Commander, Corps submitted a new requisition to the Communications Zone for additional ammunition. This requisition, for reasons still not clear, was received at 12th Army Group Headquarters, where it was reviewed by the Artillery, Ordnance, and G4 sections. With the approval of the G3, these sections decided that the Corps

requirements could be fulfilled from the Third Army allocation for this period, and agreed that about 3,500 tons should be released immediately.

Allocation of the ammunition was only part of the problem, however. Transportation was an even bigger limiting factor. Since the Communications Zone's transportation facilities were already committed to the fullest extent, it was recognized that delivery could not be made unless a proportionate amount of lift was diverted from the maintenance of the armies. This proposal did not meet with the approval of the Third Army. When informed of it, the Ordnance Officer, Colonel Nixon, asserted, first of all, that the requisition had not been forwarded through command channels; furthermore, it was his opinion that the VIII Corps had ample ammunition available for its task, and that if additional ammunition were required it could be supplied by the Third Army. He, therefore, requested that the Army Group take no action on the Corps' requisition, and that the request be forwarded to the Army as a matter pertaining to that headquarters. Colonel Muller supported the Ordnance Officer in this recommendation, and the Army Group accordingly advised the Communications Zone to take no action on the Corps' requisition.

By this time, there was sufficient cause for concluding that there had been a misunderstanding concerning the supply responsibility for the Brittany operation, and, in the minds of some staff officers at the Army Group rear headquarters, there was even some question concerning the command relationship between the VIII Corps and Third Army. General Hinds, the Artillery Officer, favored the immediate shipment of at least one-half of the VIII Corps' requisition so that there would be no question about adequate support of the attack on Brest. The Army Group G3, Brig. Gen. A. Franklin Kibler, also emphasized the importance of the VIII

Corps' mission. On 22 August, he discussed the Brittany operation with General Patton, who again gave assurances that there would be sufficient ammunition.

As a precaution, meanwhile, it had already been decided to send an officer from the Army Group G4 section to the VIII Corps to investigate the ammunition situation, and at about the same time Generals Bradley and Patton themselves flew to the Corps CP. In consequence of this visit, the Army Group decided, on 23 August, to relieve the Third Army of all supply responsibility for the Brittany area, and authorized the VIII Corps to deal directly with the Communications Zone on supply matters. Tactical control remained with the Third Army for the time being. Army Group then sent a courier to the Communications Zone with instructions to make immediate shipments of approximately 8,000 tons of ammunition to the VIII Corps. This allocation was believed to be large enough to provide the Corps with a reserve of 3 units of fire, in addition to maintenance for 6 days, the time which the Artillery and G3 sections estimated would be required for accomplishment of the mission.

While these actions removed all doubts regarding the responsibility for supply in the Brittany area, they by no means constituted a guarantee that the needed ammunition would be delivered. On 25 August, with assurances that sufficient resupply of ammunition was on the way, VIII Corps launched its attack on Brest. Two days later, however, General Hinds, who had gone to the Corps to check personally on the supply situation, reported that no ammunition had been received as a result of the allocation of 23 August. Consequently, there were insufficient quantities to sustain the attack which had already begun. On 28 August, to add to an already frustrating situation, it was discovered that there was a basic misunderstanding between the Army Group and the Corps as

to the latter's ammunition requirements. On that day, two officers from the Corps appeared at the 12th Army Group Headquarters, reporting that deliveries of ammunition had still not begun and, obviously suspicious that the Corps' needs were being neglected, asserting that they wished to establish "firm requirements" for Class V supply. They were then shown the Army Group directive to the Communications Zone of 23 August, and told that this directive had been issued on the assumption that the requests made on 21 August to the officer from the Army Group G4 section, Major Joseph Peters, represented the Corps' full requirements. It was then learned from the two Corps emissaries that the requests actually represented only the minimum requirements which the Corps regarded as necessary to have on hand, prior to the launching of the attack. Since the ammunition allocated earlier had not yet begun to arrive, the misunderstanding was not immediately serious. It was now necessary for one of the Corps officers to draw up new requirements, to include both reserves and daily maintenance needs. These were reviewed by the Army Group G3 and Artillery Officer, who scaled down the requests for the more critical items and increased the allocation of items in less critical supply. The revised allocation provided for a 7,700-ton reserve and 1,400 tons per day for maintenance. Based on these computations, a new directive was dispatched via officer courier to the Communications Zone on 29 August, with the stipulation that these shipments were to have the highest possible priority for transportation.

The courier who brought the latest Army Group directive to the Communications Zone was informed by General Stratton, the G4, that the Communications Zone had already arranged for the shipment of 8,000 tons of ammunition as a result of the allocations of 23 August. Approximately 3,000 tons had been dispatched on six

trains, and the shipment of another 5,000 tons had been arranged for in 11 LSTs which were to sail between the 26th and 29th. These vessels were to deliver their cargoes to a beach which had been opened at St. Michel-en-Greive, about 15 miles northeast of Morlaix, through which the Corps had already been receiving a portion of its supplies for the past 2 weeks. Unfortunately, the ammunition allocated on 23 August had not arrived in the quantities scheduled. Some ammunition arrived by both rail and LST on 27 August, but the LSTs were lightly loaded, three of them bearing less than 100 tons each. In the period 27-30 August, the Corps received only 5,300 tons, which was insufficient to sustain its attacks. The inadequacy of receipts and uncertainty of replenishment forced reduction of expenditures after the first 2 days of the attack. Fires were largely restricted to counterbattery, the support of local operations, and defense against counterattack. Harassing and interdiction fires were also naturally reduced.

The delay in providing satisfactory logistic support to the Corps had caused increasing anxiety in the final days of August. In a message to General J.C.H. Lee, Commanding General, Communications Zone, on the 28th, General Bradley expressed great concern at the possibility that the Brest operation was being hampered by lack of ammunition. Meanwhile, General Middleton, the VIII Corps Commander, made repeated appeals for the necessary means to carry out the mission he had been given. On the 29th, he re-emphasized the desperate straits of the Corps in a radio message to the Army Group Commander, and in view of the bad state of communications, took the precaution of repeating his message via letter. In it he was unequivocal in his statement of the Corps' supply situation and its effect on tactical operations. "Our ammunition situation is critical," he noted, "due to

failure to meet our initial request. If something is not done immediately, I will have to stop offensive action." Thus far, he said, supply had not kept pace with a unit of fire per day, with the result that the Corps, in some cases, had eaten into its basic loads. Once more he repeated his earlier request for 3 units of fire maintained in the Corps ASP in addition to basic loads.* At the close of his letter, he re-emphasized that the Corps was battering against a strongly fortified area, and that progress had been extremely slow. Ammunition was, therefore, the prime requirement; without it he believed the struggle could drag on indefinitely, for he was convinced that Ramcke, the German Commander, would expend all his resources before capitulating.

By this date (29 August), the exasperation of the VIII Corps Commander and his staff was quite evident, and understandable. The repeated assurances from higher headquarters had not been followed by adequate shipments of ammunition. Furthermore, the entire problem had, in the view of the Corps Commander, become unnecessarily complicated by red tape and excessive channels. The VIII Corps had been authorized to deal directly with Brittany Base Section at Rennes, which in turn dealt with its superior headquarters, Communications Zone. But the latter would deal with the Corps only through the 12th Army Group Headquarters. In the opinion of General Middleton, the Corps was being given the "run-around." In view of the many delays, plus the suspicion that its operation had become something of a sideshow (450 miles from the principal theater of battle), it is not surprising that the Corps should regard its position as little better than that of a stepchild.

Upon receipt of the second allocation on 29 August, General Stratton, the Communications Zone G4, had immediately

* A unit of fire for the Corps as then constituted weighed 2,000 tons.

taken steps to arrange the additional shipments by asking Army Group for five LSTs per day for 7 days, plus three per day thereafter, until the shipments were completed. As an added insurance, the G4 directed that three trains per day for 4 days be dispatched to the Brest area beginning on 31 August, loaded to capacity with the same types of ammunition. As of 30 August, then, arrangements had been completed for shipment via water of 2,500 tons of ammunition per day for 7 days and 1,500 tons per day thereafter (on the basis of 500 tons per vessel), and an additional 1,500 tons per day by rail for 4 days. These shipments were to be in addition to those already authorized in the earlier allocation of 23 August. Meanwhile, pending the arrival of the scheduled shipments, the VIII Corps Commander continued to send urgent requests for items which were most critically needed. On 31 August, for example, the Corps made a special request for 90-mm gun ammunition and for air shipment of one million rounds of caliber .30 ball cartridges (in 8-round clips). Both requests were approved, but the supply of the Corps continued to be plagued by endless difficulties. The air shipment, for one thing, proved impossible because of bad weather, and the cargo had to be transferred to trucks. Of the ammunition requested, stocks were not even on hand in the rear areas to satisfy the requirements in certain types.

SHAEF Intervention

In the meantime, Supreme Headquarters also became involved in the whole problem and sent officers to both the Communications Zone and VIII Corps to check on the supply situation, and to do what they could to expedite matters. Discussions with both General Stratton and the Corps Commander, on 2 September, disclosed that the progress in meeting the Corps' requirements was still discouragingly slow. Receipts of ammunition in Brittany, up

to this date, had either been expended or were included in the stock position which the Corps Commander, on 2 September, had indicated amounted to less than 1 unit of fire. Stocks of some items were completely exhausted. One of the troubles, it was revealed, arose from the failure to follow through on shipping orders. In the opinion of Lt. Col. Joe M. Ballentine, the SHAEF officer who had gone to Communications Zone Headquarters, the Communications Zone had assumed that its orders were being executed, while shipments actually were not being accomplished as scheduled. There was no way of knowing, he noted, whether or not deliveries were being made. One of the best illustrations of the lack of follow-through was the experience with a special truck convoy, scheduled by General Stratton, for the shipment of approximately 2,000 tons of critical items. On 6 September, it was discovered that the 10 truck companies, which a regulating officer had designated to fall out of the *Red Ball* run and report to Omaha Beach for loading for this mission, had not been dispatched as scheduled. These companies were instructed by the Advance Section not to leave the *Red Ball* under any circumstances, and they had complied with these orders. This situation had gone undiscovered for 18 hours, resulting in still another delay.

Despite all efforts at expediting the flow of ammunition, the entire problem continued to be predated with uncertainty. A big air effort against the enemy fortifications was made on 3 September, but an all-out ground attack, planned for the following day, was again deferred because of the ammunition shortage. On 6 September, both of the officers sent out from SHAEF, Lt. Col. Edwin N. Clark and Lt. Col. Ballentine, were at the VIII Corps Headquarters, and on the basis of recent performance, were pessimistic about the prospects of building up the quantities which General Middleton insisted he must

have before resuming the attack—that is, 3 units of fire—and the assurance that an additional unit would be delivered on each succeeding day. Arrivals by LST, thus far, had been sporadic; vessels had arrived without manifests; and the loadings had averaged only 300 tons as against the 500 tons planned. Receipts had, therefore, barely sufficed to meet daily maintenance requirements. Most irritating of all, was the lack of information as to what could be expected. On 5 September, Colonel Clark had attempted to arrange a radio conference with General Stratton, but had received no response to his message to the Communications Zone. Impatient with the latter's silence, he addressed a second message to both General Lord (the Chief of Staff), and General Stratton the following morning. Stressing once again the urgency of the Brest situation, he noted: "Getting ammunition out here is a vital matter which your office does not seem to understand. We must have not only ammunition but also information relative thereto. . . . What in the name of Pete is wrong with Com Zone?" Under the authority delegated him by Generals Crawford and Smith of the Supreme Commander's staff, Colonel Clark then requested complete information on all shipments. To the Supreme Command, the capture of Brest still held the highest priority, a fact which Colonel Clark's message hinted might possibly not be fully appreciated by General Lee's staff.

At the Communications Zone Headquarters, the importance of the port had already begun to diminish. In view of the availability of the Channel ports, General Lord was ready to recommend to the Army Group Commander that Brest be abandoned, except for a small containing force. Whether this attitude was reflected in lack of enthusiasm in connection with the ammunition shipments is doubtful. Nevertheless, on the basis of recent experience, the two SHAEF emissaries expressed doubt

over the Communications Zone's ability to ship the quantities which the Corps indicated were required for the capture of Brest.

The doubts and uncertainties over the supply of the VIII Corps reached their height on 6 September. On that date, still another officer—Lt. Col. L. H. Harrison from the Ordnance Section of 12th Army Group—sent to investigate the Corps supply difficulties reported his findings. He noted that General Middleton and his staff, by this time, were of the opinion that so many people and agencies had become involved in the ammunition problem that the whole matter was hopelessly entangled and beyond clarification. The Corps Commander and his staff, Colonel Harrison observed, were convinced that no one really knew how much ammunition was actually available, or en route or on order.

On that date, however, General Stratton at last gave specific advance information regarding deliveries to the VIII Corps, and his assurances to Supreme Headquarters that the Corps supply situation would soon be in a healthier state were shortly substantiated. Receipts on 7 September raised the ammunition stocks in the Corps ASP to an average level of 2 units of fire. While this was below the minimum which General Middleton had specified as a prerequisite for the resumption of the attack, he nevertheless ordered the attack on Brest launched on 8 September, on the assurance that a steady stream of ammunition was now on the way. In the succeeding days, the ammunition picture brightened considerably, and on 12 September, the Corps ASP held more than 13,000 tons, with a minimum of 3 units of fire in all types. Additional shipments were en route via LST, rail, and truck, guaranteeing sufficient Class V supply to support sustained operations. The VIII Corps, which on 5 September came under the operational control of the newly arrived Ninth Army Headquarters (Lt. Gen. William H. Simp-

son, commanding), finally captured Brest on the 18th.

Conclusions

The difficulties over ammunition supply in Brittany were a vexing and harrowing experience for everyone concerned. In some respects, these troubles simply evidenced the overextension of the entire logistic structure which had accompanied the sudden successes of August. The difficulties in fulfilling the VIII Corps' requirements largely centered on the now chronic lack of transportation. Competition for overland transport was, of course, at its height at this time, the ammunition shortage occurring in precisely the same period as the gasoline shortage. Shipments by rail and truck both involved distances of more than 200 miles. The trip by water from the *Omaha* Beach area was of approximately the same length and was also beset with difficulties, principally bad weather and the problem of loading LSTs at the beaches. Additional complications resulted from the diversion of vessels from Normandy. Loaded in the United Kingdom and intended for discharge at the *Omaha* or *Utah* Beaches, these ships had often been bulk-loaded with the separate components of heavy artillery ammunition, the shells on one ship and the propelling charges on another. Sudden diversions to the emergency beach near Morlaix caused confusion and resulted in unbalanced stocks, so that many a heavy caliber shell lay unfired for want of the proper propelling charge. Many vessels arrived off the beach at St. Michel-en-Greve with only a partial load and without manifests.

In addition to transportation difficulties, however, there were failures of a more purely administrative nature. There was no assurance that shipments had actually been made, once orders were issued; the failure to follow through on movement in-

structions resulted in costly delays. Most aggravating to the Corps was the lack of reliable information as to the quantities and types of ammunition the Corps could expect to receive. Shipping notices rarely corresponded with the actual receipts, nor could receipts be matched with specific requisitions. Plaguing the entire operation was the bad state of communications. General Bradley's urgent message to General Lee on 28 August regarding the support of the VIII Corps, for example, required 2 days for delivery, and a message to Brittany Base Section at Rennes required 60 hours.

Not least important was the initial confusion produced by the ambiguity concerning the supply responsibility for VIII Corps. In the light of a statement purporting to come from the 12th Army Group Commander assuring the Corps an ample supply of ammunition, General Middleton did not consider the so-called rationing of expenditures as applying to him. The Third Army's denial of the Corps' requests was, therefore, regarded as an arbitrary action, and, in the view of the Corps Chief of Staff, constituted a confusion of tongues which was never entirely cleared up. Colonel Harrison, one of the last officers sent to the VIII Corps by the Army Group to investigate the ammunition situation, probably made the fairest assignment of "blame" for the sad experience. He noted that the recent difficulties had been due to the lack of proper planning for the operation by all agencies; lack of proper supply co-ordination by all agencies; lack of proper follow-through by the Communications Zone; hysterical requisitioning by VIII Corps; overoptimistic promises of impossible deliveries by the Communications Zone; and "too many parties giving instructions and too few parties carrying them out."

The Battle of the Cowpens

An Application of Certain Principles of War

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THE object of this article is to show how the proper application of certain principles of war led to the winning of the Battle of the Cowpens during the American War of Independence.

Events Leading up to the Battle

Following the unsuccessful attempt by the British to divide the Colonies by taking the line of the Hudson River and Buttevant's surrender, Sir Henry Clinton, British Commander in America, withdrew his remaining forces to New York. Lacking sufficient force to renew the campaign, Clinton decided to send raiding forces into New England and the South. He felt that these raids would make the War so unpopular and uncomfortable for the bulk of the people, that the "rebels" would sue for peace.

The initial raids in the South by the British were successful. The Colony of Georgia was overrun; British civil authority was re-established, and Georgia was declared out of the War by the British.

Encouraged by this success, Clinton reinforced his troops in the South. The new object of the British campaign, based upon Savannah and Charleston, was to subdue the populace and defeat the American Army operating in the Southern Theater.

In general, the American tactics were designed to draw the British Army away from their bases, cause them to divide their forces, and yet avoid giving battle where the outcome could be decisive.

The British forces were regular troops. The Americans had a few regular troops, but the bulk of their forces were untrained and untried militia commanded by volunteer officers. Recent engagements had shown that the militia were inexperienced and insufficiently trained to withstand a determined attack by seasoned troops.

By the end of 1780, no great success had come from Clinton's new measures. Lord Cornwallis, the British Commander in the Southern Theater, was still unable to fight a decisive battle with General Greene, Commander of the American troops. Supplies and manpower were wasting away without Cornwallis achieving any significant success.

The battle described below is one of a number which took place in the Southern campaign. In the over-all strategy of the American War of Independence, this small battle was, individually, of no great consequence. However, there is a great lesson in tactics and leadership to be learned from a study of the handling of this battle by General Morgan, who commanded the

Consciously or unconsciously, all commanders use the Principles of War as a check list in their planning. In themselves, they are simple; the technique of applying them to various situations is more complex

American troops at the Battle of the Cowpens.

In December 1780, General Greene divided his small force. He withdrew into North Carolina with 1100 men, and left 900 under General Morgan in South Carolina. This action forced Lord Cornwallis to likewise divide his force. He took the main body of some 2,000 men into North Carolina with the purpose of forcing Greene to fight. The remainder of his force, some 1100 men, he sent under Colonel Tarleton to deal with Morgan. The Battle of the Cowpens was fought by the two small forces under General Morgan and Colonel Tarleton respectively.

British intelligence during this period was excellent. Colonel Tarleton was accurately informed of the composition and location of Morgan's force. Once Tarleton's force was ready to march and his intelligence complete, he set out to make contact with Morgan, whose troops were encamped west of Charleston.

General Morgan's force consisted principally of Colonel Pickens' Militia, some veteran Continentals, and a small cavalry force under Colonel William Washington, all told, some 900 men. Upon being informed of Tarleton's advance, Morgan started a withdrawal in a northwesterly direction from what is now Spartanburg.

Tarleton pursued Morgan through the night of 16-17 January and was advised at daylight that Morgan had chosen a defensive position which appeared to favor an immediate attack by the British. Thereupon Tarleton left a small guard over his trains, hurried forward, and prepared to attack.

The position chosen by Morgan would appear to be poor, if one had no knowledge of his plan. He had chosen a low hill, on which his main defensive position rested. Immediately behind this hill there was a smaller hill, from which the terrain sloped gently for about 150 yards, terminating at the banks of an unfordable river. The

whole area was lightly wooded. From this position, there was no line of retreat; Morgan staked all upon winning. (See Sketch 1.)

Morgan, realizing the inadequacy of his force both in numbers and in training, chose this apparently poor tactical ground to achieve an almost perfect *Cannae*. The three main subdivisions of his force were the Militia, the Continentals (Regulars), and the Washington Cavalry. His dispositions were as follows:

The Continentals.—These regular troops, about 300 strong, were the principal strength of the force. They were fairly well-trained, experienced, and could be counted upon to give a good account of themselves in battle. These troops were placed in the second line of the position, that is, upon the forward hill.

The Washington Cavalry.—These troops were also well-trained, experienced, and could be counted upon in battle. The Cavalry was placed in reserve on the second hill, in rear of the position occupied by the Continentals.

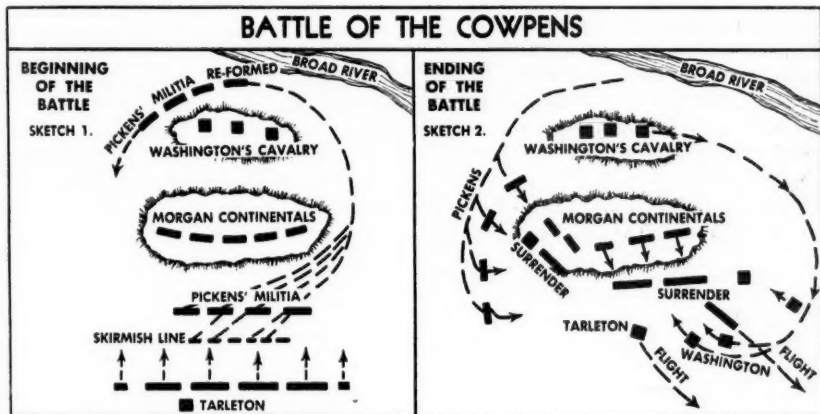
The Militia.—As already stated, these troops were relatively untrained. Previous battlefield experience with similar troops had not been favorable. They were placed in the forward position, that is, forward of the hill on which the Continentals were disposed. Recognizing that the Militia would probably break in the face of an attack by the British, Morgan told them that he only wanted and expected them to fire two volleys at the enemy upon a given signal. After that, they were free to break and run, except that they *must* retreat around his left flank, and they *must* also get behind the hill. The officers in charge of this Militia were then told privately that they were to reconstitute their force as an effective fighting unit, once they had gained their "concentration area." Realizing that the river prevented further retreat, the Militia had little choice but to do as they were told.

Against the American dispositions, Tarleton attacked with a rush. As he expected, the Militia fired their volleys and promptly withdrew. Believing this withdrawal to be similar to many others he had experienced, Tarleton pushed his attack with vigor. Upon reaching the Continentals, the British continued to advance until the Continentals had fallen back slightly toward the line of the Cavalry. Then suddenly the Continentals counterattacked. At the same time, the Cavalry attacked Tarleton's right flank and the Militia, now reorganized, attacked his left. (See Sketch 2.)

enemy's reaction to a given situation to achieve victory. The battle also is an excellent example to show the value of:

1. Surprise
2. Mass
3. Economy of Force.

The surprise achieved by Morgan was probably the deciding factor. Although Tarleton, through his excellent intelligence sources, was fully aware of Morgan's dispositions and resources, Morgan took advantage of Tarleton's knowledge of these facts to deceive him as to his real intentions, until it was too late for Tarleton



Credit: *The American Revolution*, by John Fiske. Publishers, Houghton Mifflin Co.

The battle was executed very much as it had been planned by Morgan. Of his original force of 1100, Tarleton lost some 800 men, either killed or captured; the remainder escaped and were not pursued. Morgan's losses were 12 killed and 50 wounded.

Comment

The Battle of the Cowpens illustrates the successful conclusion to a battle where the commander's plans visualized the proper employment of terrain, resources (knowledge of the capabilities of his troops), and an accurate estimate of the

to remedy his error. In the resultant surprise, Tarleton lost all control over his troops and Morgan won the day.

In this battle, Morgan had the inferior force. However, he planned his dispositions and employed his force so that, at the proper time, he had both a concentration of physical force at the right place and at the right time, and superior morale. His employment of the three forces available to him, each possessing different characteristics, shows a proper sense of balance and co-ordination that is also vital in battle. His disposition and employment

of the two experienced forces, the Cavalry and the Continentals, was such that he could still carry out part of his plan if the Militia failed to reorganize, by enveloping one flank with his Cavalry, instead of engaging in a double envelopment.

Morgan's selection of his position and the employment of his doubtful Militia were certainly classic. His appreciation of the capabilities and limitations of his own force was as sound as his appreciation of how Tarleton's force would react to the apparent flight of the Militia.

Conclusion

Although other principles of war are demonstrated in the history of this small battle, probably the outstanding one was surprise. Tarleton's personal account of the battle, published in London in 1787, admits that his surprise was complete. Tarleton said:

"The Continentals and the back-woodsmen gave ground. The British rushed for-

ward. An order was dispatched to the Cavalry to charge. An unexpected fire at this instant from the Americans, who came about as they were retreating, stopped the British and threw them in confusion. Exertions to make them advance were useless. The part of the Cavalry which had not been engaged fell likewise into disorder, and an unaccountable panic extended itself along the whole line. The Americans, who before thought they had lost the action, taking advantage of the present situation, advanced upon the British and augmented their astonishment. A general flight ensued."

From the foregoing, it appears that surprise was complete and Tarleton accredits the battle to that one factor. However, without having planned to exploit the circumstances which developed as the battle progressed, Morgan would probably have been unable to take advantage of the opportunity which offered itself when the enemy's surprise led to his confusion.

The *time* concept in war has changed astonishingly during the last decade. Aside from giving tremendous advantage to an aggressor who strikes without warning, the world's new inventions have so altered the time and space factors that there is little hope in these days for the nation who must do her planning after war starts.

Armed Forces Talk

Command in a Combined Theater of Operations

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This article supplements the principles of combined command in the article entitled "Organization for Combined Warfare," by Lieutenant Colonel E. O. Peckham (MILITARY REVIEW, November 1950).

The views expressed are the author's and are not necessarily those of the Department of the Army, the Army War College, or the Command and General Staff College.—The Editor.

ALL the major wars of recent times have been examples of the combining of the war efforts of several nations into a collective effort against a common enemy. In most cases, this common enemy also consisted of a coalition of nations. Such coalition warfare presents a multitude of complex problems, some of which are political while others are military. Nonetheless, these problems must be solved if a war is to be won with a minimum cost in human lives and material resources. It is beyond the purview of the military to resolve the national and international political problems which will arise, but the necessity of solving military problems is the lot of military men. However, these military problems are difficult of solution

because they cannot be entirely divorced from their political implications and solved independently.

In a previous article on this subject, "Organization for Combined Warfare," Colonel Peckham discussed the broad aspects of combined warfare. In that article, he listed a number of problems of combined military command and combined military planning at the international, the national, and the theater levels. This article is written under the assumption that those international military and politico-military problems are valid as listed, and that they can be satisfactorily resolved.

Even so, there still remain three basic problems, purely military, to be solved at the theater level. These are the problems of command, logistic support, and liaison within the combined theater itself. Unquestionably, many more problems of allied co-operation can be listed, but they all stem from the above listed basic considerations. Their solution will, of course, be conditioned by the solution of the three basic problems. This article will deal with these aspects of combined operations at the theater level, and will develop a command structure and a staff organization designed to meet them.

While the problems of combined operations are complex, the formation of an adequate staff organization will assist in their solution. Co-operation is still the keystone of successful combined warfare

Definitions

Before proceeding further, two terms which will appear should be defined for a clear understanding of the problem. These are:

Command.—Command is a term used to express the authority and the power of a military commander to exercise completely all necessary military functions over troops placed under his orders. Such functions include training, discipline, administration, supply, and control and direction of military operations.

Unified command (operational control).—Unified command is a term used to express the authority and the power of a military commander over forces placed under his orders to assign them missions and objectives, and to exercise strategic and operational direction of the military operations of these forces. In the exercise of this function, the commander may designate the general size and the nature of the forces, as well as the means that will be provided, in order to integrate properly individual efforts into a combined whole.

True command of forces, as defined above, can be considered to be normal for a military commander over troops of his own service, from his own nation. Depending upon the relationship between the components of the armed forces of the individual nations, this type of command may or may not apply to a commander from one service over troops from another service of his own nation. It is doubtful if the complete authority contained in true command will ever be vested in a commander in chief appointed from one nation over troops provided by another nation. Certainly there is no historical basis for such an assumption. The authority of such an international commander is more properly defined as unified command or operational control.

Historical

One of the most important steps in the planning for combined operations is the

development of sound command relationships which will accomplish the objectives of combined warfare in a theater of operations. The history of World War II provides some examples of combined command structures that did succeed. In particular, the European Theater of Operations (ETO) presents an excellent over-all picture of a solution to the problem, and it can well serve as a basis for study and development.

In the ETO, the chain of military command, to include major Allied components of the theater, was as shown in Figure 1.

In this structure, command at the top level was vested in the Supreme Commander. This type of command relationship can be called functional, because the Supreme Commander exercised his command over the combined Allied naval and tactical air forces through separate commanders in chief. In the case of the Allied army groups, the Supreme Commander retained direct unified command himself, rather than commanding them through a commander in chief of the combined army forces. This resulted in direct contact of Supreme Headquarters, Allied Expeditionary Forces (SHAEF), with the Allied army groups. As a result, the dividing line between the functions of SHAEF and Headquarters, European Theater of Operations, US Army (ETOUSA), was not clearly established. It further forced the staff sections of SHAEF to assume dual functions and interests within the affairs of ETOUSA, when their primary interest and responsibility clearly rested in matters pertaining to Allied affairs. Under a functional type of command such as this, the designation of a commander in chief of Allied army forces and of a US theater army commander within the over-all combined theater would have eliminated this condition.

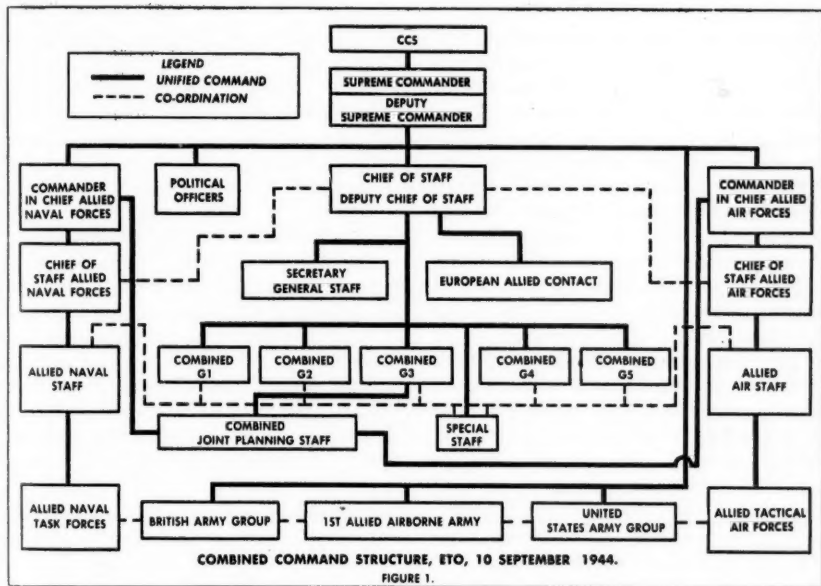
The guiding principle in building up the SHAEF combined staff was generally that equal British and American representa-

tion would be effected both as to position and numbers. This plan of staff integration was applied not only to SHAEF itself, but also to Headquarters Allied Air Forces and to Headquarters Allied Naval Forces.*

The G1, G2, G3, and G4 staff sections of SHAEF functioned in accordance with normal procedures. The G5 section advised the Supreme Commander on matters per-

summaries of the decisions made by the Chief of Staff and his Deputy.

The Supreme Commander stressed the need for close contact and fullest co-ordination between all the planning and the command agencies under his command. The combined staff of SHAEF was concerned primarily with matters pertaining to ground operations. The combined staffs of the headquarters of both the Allied Air



taining to the civilian population, and developed and published the policies of civil administration to be followed by the Allied forces in the European campaigns.

The Secretary of the General Staff at SHAEF, in addition to performing his normal duties, functioned in the capacity of an Executive to the Chief of Staff. The section was relatively large. It maintained records, and prepared statistics and daily

Forces and Allied Naval Forces were concerned with air and naval operations respectively. To accomplish the necessary co-ordination between the three service components, a Combined Joint Planning Staff was organized in SHAEF. This planning staff included representation from the Allied Air and Naval Staffs and reported to the Chief of Staff through the SHAEF G3. It acted in a co-ordinating and advisory capacity, and was also charged with laying the groundwork for future planning. In effect, then, the operations of the ETO

* Staff integration is defined as a staff arrangement wherein all services or nationalities represented have a proportionate membership on the staff, and occupy an equitable number of staff positions.

were carried out by three separate headquarters, which were co-ordinated by the Chief of Staff of SHAEF through the combined staff of SHAEF and the Combined Joint Planning Staff.

A group of civilian advisers in the economic and political fields was established in the Headquarters and reported directly to the Chief of Staff SHAEF and the Supreme Commander. This group was advisory in nature and had no command functions.

The purpose of the European Allied Contact Section was to maintain contact with the European Allied governments, without sacrificing the vital safeguards of security. European countries appointed Liaison Missions which normally functioned at the army group level, but the heads of which were accredited to SHAEF. By that means, the Supreme Commander could consult with them as necessary. The functions of the Liaison Missions were to advise the army group commander, and to act as the representatives of their respective governments pending the liberation of their countries. Co-ordination of the work of these missions was the responsibility of the European Allied Contact Section of SHAEF.

Evaluation

As in all studies of historical events, any analysis of command structures and other military problems of the past, together with their solutions, must be evaluated in the light of the particular situation for which they were designed, and to which they applied. In the study of the Allied command structure in the ETO during World War II, it must be borne in mind that the structure was designed to fit a particular set of conditions.

The situation in World War II was unique in that the two principal collaborating nations in Western Europe had as nearly perfect conditions as possible. For example, they spoke a common language, were not too dissimilar in tactical organiza-

tion and doctrine, employed reasonably similar command and staff organizations and procedures, and were traditionally friendly. Furthermore, the then governmental heads of both the United States and Great Britain enjoyed a close, personal friendship, and possessed personalities which were compatible to a degree unprecedented in any previous history of allied collaboration. Under such favorable conditions, both political and military cooperation in Europe was greatly facilitated. However, these same optimum conditions may not exist in future combined warfare. The problem of combined warfare was complex enough even under these favorable conditions. It becomes much more complex as the number of participants increases and less favorable conditions exist.

World-Wide Considerations

The world of today is governed by sovereign nation states. This national sovereignty is reflected, not only in the international political and economic contacts of these states, but also in their internal military structures and relationships. Until a world government of some sort is formed which will have the authority to make effective international laws, and the power to enforce them, this condition will prevail. For obvious reasons, the military planner's solution to the problems of combined theater operations must accept and be based on this fact.

Since the end of World War II, a number of regional defense pacts have been established within the framework of the United Nations. Under the provisions of these international pacts, the member states have voluntarily grouped their resources for common security, but they have not surrendered their individual sovereignty. This they have done in spite of differing individual national cultures, traditions, languages, and military organizations and doctrines. These regional coalitions have created over-all conditions

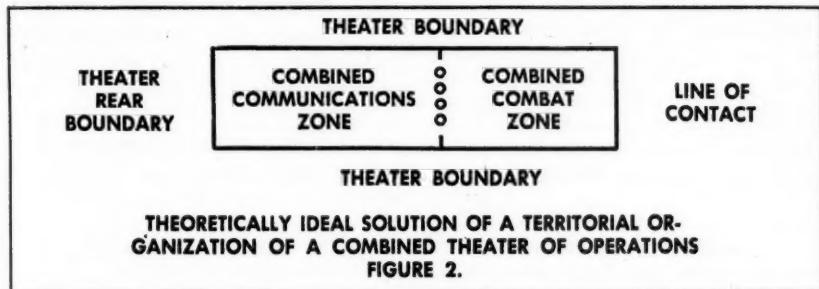
and military problems more difficult of solution than those which existed between the United States and Great Britain in the last War. Nonetheless, these coalitions can and must provide the basis for the solution of the problems.

Territorial Organization

Perhaps the first consideration within the combined theater of operations affecting the command structure is that of territorial organization. This consideration is closely interwoven with matters of logistics, and other purely national military matters such as training, existing military organization, existing tactical and

is especially true if that nation (or nations) has a widely dissimilar tactical and service organization; different doctrines, procedures, supplies and matériel, and national preferences or prejudices for foods; as well as language and cultural differences.

The theoretically ideal solution for this problem is portrayed in Figure 2. A territorial organization such as this requires that units (both tactical and service), and supplies and matériel, be completely interchangeable. Unless and until a much greater degree of standardization of these, as well as of procedures and doctrine, is achieved than exists today (and more is



staff doctrines and procedures, and the like.

When conducted by a single nation, the territorial organization of a theater of operations presents no great problem. Regardless of the nation which is fighting in such a theater, it is divided into two general categories: a combat zone for tactical operations, and a communications zone for service and supply operations. Both of these zones will be organized according to the doctrines of the particular nation concerned.

In a combined theater of operations, the territorial organization is the same; that is, the breakdown again is into a combat zone and a communications zone. However, the introduction of one or more additional nations into the theater complicates the problem of territorial organization. This

foreseeable in the immediate future), it is doubtful if such a territorial organization is feasible in a combined theater, in which two or more nations or regional coalitions of nations are making comparatively equal and major war efforts.

Again using the ETO as a historical example of successful large-scale combined operations, we see that such a territorial organization was not used for the Theater. There, United States forces organized and operated their own communications zone, while the organization for logistics support of the other nations took forms peculiar to those nations. The same was true of the combat zones, with the United States, the British, and the French each organizing and operating their zones in their own distinctive manner. This brings

up an interesting contradiction contained within the over-all Allied structure in the theater. As indicated in the discussion of Figure 1, the over-all structure was organized on a functional basis, while an analysis of both the tactical and service operations reveals that they were conducted on a zonal basis. This was true except in emergencies which had theater-wide implications, such as the Battle of the Bulge.

The territorial organization indicated in Figure 2 does have a historical precedent in World War II, but only on a level lower than that of a theater. Such an organization was found to be necessary, for situations in which the forces, contributed by certain nations for employment in established zones of operations, were not large enough to warrant complete reorganization of the existing combat and communications zones. The Mediterranean Theater of Operations provides a good example of such a situation. In this Theater, comparatively small tactical forces from Brazil, Poland, France, and other Allied nations were employed with the American Fifth Army and the British Eighth Army under the principle of unified command. These two Armies each established and operated their own combat and communications zones according to their own methods, and modified them as necessary to accommodate the additional forces. When the Theater as a whole is considered, however, the territorial organization corresponded more nearly to that portrayed in Figure 3.

From the foregoing discussion of logistic support, and considering the number of nations that will probably be involved in any future war, it appears logical to conclude that national or regional zones of operations are highly desirable, if not absolutely necessary. This conclusion is given added emphasis when one further considers the present lack of standardization, and other problems inherent to combined warfare. If zones of operations are

assigned, the territorial organization of such a combined theater may appear schematically as shown in Figure 3. In an organization for logistic support such as this, the following considerations apply:

1. Boundaries for the zones extend to the rear to include a communications zone for each principal combat zone.

2. Each communications zone must be augmented, as necessary, by service units of contributing nations within that zone, in the type and numbers required to perform the logistic functions peculiar to the combat forces of those nations.

3. Policies must be established by the combined theater headquarters for the common use and operation by two or more communications zones, of such installations and facilities as ports, inland waterways, air bases, road and rail nets, and signal communications.

Organization for Command

Regardless of the type of command structure developed for a combined theater of operations, it must be capable of meeting three principal requirements. These are:

1. The supreme commander must have the ability of exercising unified command over all allied forces placed at his disposal.

2. The forces should normally be employed under the military commanders of their own respective nations, thus providing increased harmony and facility of employment as well as retaining national prestige of senior allied commanders. As previously indicated, this requirement is further conditioned by logistical considerations.

3. The supreme commander must have the ability to mass allied forces by type, at critical times and in critical areas, without regard to nationality.

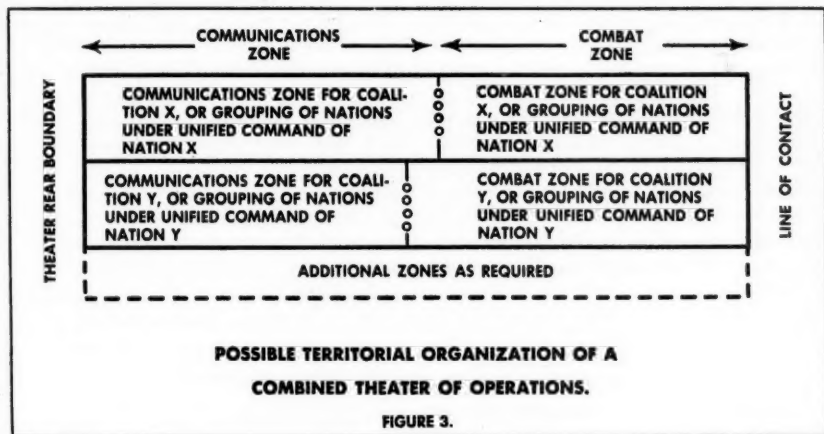
Dependent upon the size and type of forces provided by the contributing nations, and the magnitude and the concept of the operations to be undertaken, sep-

arate zones for military operations should be established within the theater. The joint forces assigned to such a zone might be those of a major contributing nation, or a grouping of nations in a regional coalition. This method of zonal organization must recognize the strategic and tactical requirements of the supreme commander's plan, and in no way reduce his ability to shift forces rapidly from one zone to another as the situation may re-

navy forces, and allied air forces. This method of command facilitates both the massing of combined forces by type at critical times and in critical areas, and the shifting of air and naval support for the ground effort.

The Combined Staff

Several types of staff organization could be employed for the supreme headquarters. Regardless of the basic type of organiza-



quire. This procedure offers the advantage of simplifying control and co-ordinating effort where a number of nations are contributing military forces, as would be the case under the terms of the North Atlantic Pact. Under this plan, over-all missions would be assigned to the zone commander for operations within his zone, and the supreme commander could easily weigh the effort in the zones by shifting the allocation of air, ground, or naval forces, and logistical support, as necessity demands.

The requirement for the exercise of unified command by the supreme commander suggests that he exercise this command through three deputy supreme commanders; one each for allied army forces, allied

tion, adopted, however, the theater combined staff must meet the following requirements:

1. It must be capable of supervising and co-ordinating, theater-wide, for the supreme commander, all of the major functions of command, and must be capable of advising the supreme commander on the exercise of these functions.

2. It must be capable of planning, supervising, and co-ordinating the operations of all major allied forces, theater-wide, periodically, or as necessary.

3. It must be capable of preparing theater plans well in advance of contemplated operations.

4. If deputy supreme commanders for the army, navy, and air force are ap-

pointed, the over-all staff structure of the combined theater headquarters must provide for minimum essential staffs to assist them in the exercise of their functions.

5. It must provide for a reasonable representation from each of the contributing nations, in proportion to the type and size of forces provided. Through the process of staff integration, it must be further evolved as a truly combined staff.

6. It must standardize staff procedures throughout, and must take steps to establish a minimum of common languages for intrastaff functioning.

Liaison

Liaison can be defined as the contact or intercommunication maintained between parts of an armed force to ensure mutual understanding, and unity of purpose and action. In a combined theater of operations, liaison provides another means to resolve many of the problems of combined command.

In addition to the liaison provided by the command and staff previously discussed, liaison is used in other areas:

1. The multiplicity of languages makes it necessary that operation orders must be translated into the language of the forces that are to execute them.

2. Political liaison will be desirable in the supreme allied headquarters between the supreme commander, the nations contributing to the war effort, and the nations to be liberated or occupied.

3. Liaison will be required in any headquarters under which the forces of another contributing nation are employed. This may take the form of staff representation or liaison parties.

4. Liaison will be mandatory where the forces of one nation are supported by forces from another nation.

5. Liaison will be required laterally between forces from separate nations, when these forces are co-operating in the accomplishment of a common mission.

Proposed Command and Staff Structures

Considering the many and varied problems of coalition warfare, it becomes obvious that a simple and clear-cut solution covering them all is difficult, if not impossible, to attain. The solution actually resolves itself into one of achieving an acceptable compromise. On the one hand, the planner attempting to solve the many problems and overcome obstructions develops structures so complex and cumbersome as to be completely inflexible and unsuited for military operations. On the other hand, complete disregard for the fundamental problems can result in an extremely simple solution on paper, but one which will not work. The final command and staff structures developed must be such as to provide for the solution of the maximum number of problems, and yet retain enough simplicity and flexibility to cope with the everchanging complexities of modern war.

The fundamental concept of the proposed solution is simple. Briefly, it is to provide over-all allied command and staff structures which are designed to control and direct the military operations of national or regional coalition zones of operations. Each zone is organized and operated according to the doctrine and the procedures of the nation therein; or, if a coalition of nations, according to commonly agreed upon doctrine and procedures. In effect, an individually organized joint subtheater of operations is established for each major contributing nation or major grouping of nations which are operating in a combined theater. Such a solution accepts and utilizes the fact that individual nations have developed their own peculiar doctrines and procedures for joint theaters of operations. Interservice concepts, contacts, and relationships may be quite different between these nations. To superimpose a still different combined theater organization over such national organizations will result in complex structures and relationships

which, at best, will be time-consuming, and which will eventually breed confusion, disunity, and disunity.

Figure 4, showing the command relationships between a Supreme Commander, the governments participating in the over-all effort, and those nations participating within the combined theater itself, is completely zonal in character. In this organizational structure, the following major

Ministers. ("Organization for Combined Military Effort," MILITARY REVIEW, November 1950.)

2. Top level politico-military direction of the allied war effort is achieved by the UN Security Council or by a Council of Defense Ministers. ("Organization for Combined Military Effort," MILITARY REVIEW, November 1950.)

3. Top level strategic direction and co-

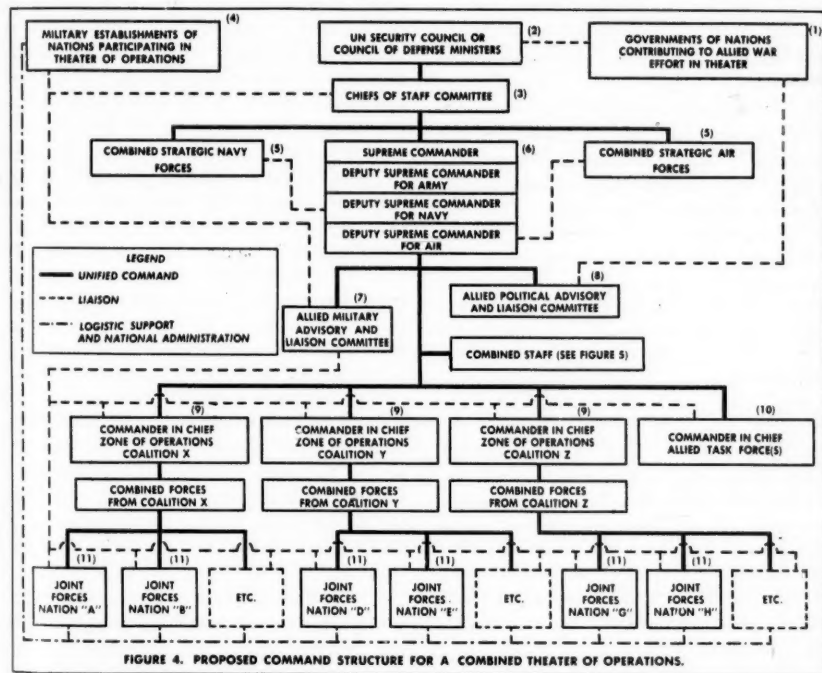


FIGURE 4. PROPOSED COMMAND STRUCTURE FOR A COMBINED THEATER OF OPERATIONS.

considerations apply. (The numbered paragraphs below relate to Figure 4.)

1. The governments of the nations contributing to the allied war effort may be party to one or more regional defense pacts. Determination of both the political and the military roles to be played by these nations is a function of the Security Council of the United Nations (if a UN war effort), or by the Council of Defense

ordination of the over-all military prosecution of the war is accomplished by a Chiefs of Staff Committee. ("Organization for Combined Military Effort," MILITARY REVIEW, November 1950.)

4. Logistic support and other matters of military administration, such as mobilization, training, and discipline, are on a national basis. The current lack of military standardization as well as language

and cultural differences makes this mandatory.

5. Combined strategic air and naval forces are controlled directly by the Chiefs of Staff Committee. Actual operations may be carried out either under combined command or as an individual national effort co-ordinated by the Chiefs of Staff Committee. When strategic air or strategic naval operations are within or directly influence theater operations, they are co-ordinated for the Supreme Commander by the appropriate Deputy Supreme Commander.

6. The Supreme Commander and the three Deputy Supreme Commanders are appointed by the Chiefs of Staff Committee. They must be acceptable to the nations contributing forces to the theater. The Supreme Commander exercises *unified command* over all forces placed under his orders, regardless of service component or nationality. Deputy Supreme Commanders exercise unified command, for and in the name of the Supreme Commander, over the combined forces of their respective services in the theater, within the limits of the authority delegated to them by the Supreme Commander. Since Deputy Supreme Commanders are acceptable to all nations contributing forces to the theater, they may act, at times, as over-all allied commanders for their respective services. This will facilitate the massing of combined forces, by type, at critical times in critical areas, regardless of nationality. Thus the major advantage of flexibility of a functional type of command structure is retained for emergency use, or when expedient. At the same time, the structure provides for normal theater operations to be carried out by zones under national or regional commanders, thus ensuring increased harmony and facility of employment and minimizing the many problems inherent to combined warfare.

7. The Allied Military Advisory and Liaison Committee is composed of mili-

tary representatives of the participating nations. This Committee advises the Supreme Commander on matters of national military interest, and maintains liaison between national military establishments, the Supreme Commander, and the national military forces within the theater. Such a committee relieves the Supreme Commander and his headquarters of the responsibility of maintaining this liaison. Since logistic support and administration must be on a national basis, the *functions* performed by this Committee are indispensable. When a large number of nations are participating in the same theater, the Committee itself becomes indispensable.

8. The Allied Political Advisory and Liaison Committee has representation, as deemed necessary, by the contributing nations or as requested by the Supreme Commander. This Committee advises the Supreme Commander on the political implications of military operations within the theater. It provides a ready access by the Supreme Commander to individual governments on matters of interest to a particular nation. With a small number of nations participating in the theater, contacts such as these could be maintained by the Supreme Commander and his staff. Like the Allied Military Advisory and Liaison Committee, when a large number of nations are participating, the Committee is indispensable.

9. The Commanders in Chief of the various zones of operations are appointed by the regional coalitions concerned. They receive their missions and orders for zonal operations directly from the theater Supreme Headquarters. Their organizations are joint, and they exercise unified command over all forces in their zones. Normally, theater forces are employed in these zones in their own distinctive manner, under their own national commanders. In cases of emergencies having theater-wide implications, or when otherwise directed by the Supreme Commander, certain parts

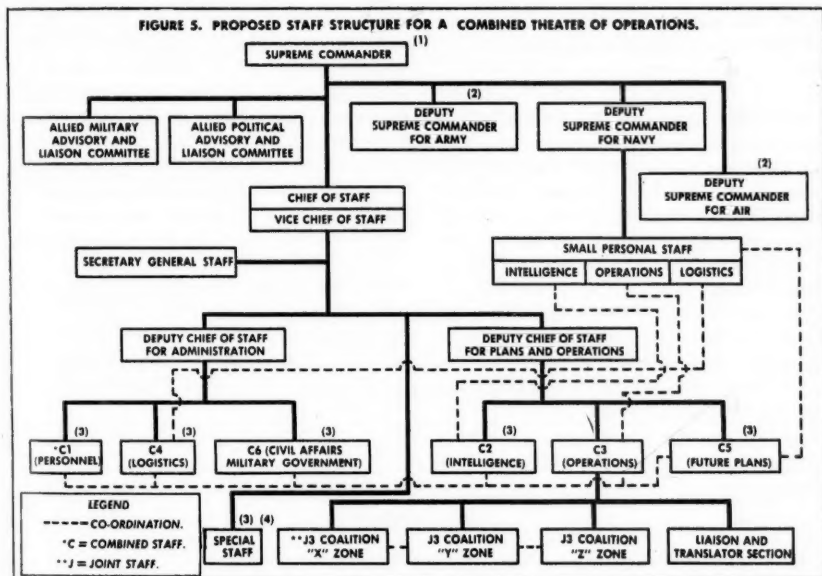
or all of the various forces under zonal command may be placed under the unified command of the appropriate Deputy Supreme Commander.

10. When needed, Allied Task Forces are organized by the Supreme Commander from allied forces assigned to the theater. The commanders of such forces are appointed by the Supreme Commander.

11. The forces of one nation may be augmented, as necessary, by other nations,

joint theater staff. In the organization shown in Figure 5, the following considerations apply. (The numbered paragraphs below relate to Figure 5.)

1. The Chief of Staff and his Deputies, as well as key section chiefs, are appointed by the Supreme Commander. These individuals may or may not be from the same nation as the Supreme Commander. If there are enough prewar contacts between the various allied military forces, it is en-



in order to tailor them properly for the missions assigned. This applies both within a regional grouping, and between such groupings. Forces of lesser contributing nations may be employed under the operational control of major contributing nations.

Like the command structure proposed in Figure 4, the staff organization for a combined theater of operation is also zonal in character. This combined staff is based on the pattern of a United States

tirely conceivable that the best qualified men can be selected for the jobs, regardless of nationality. The primary consideration here is the fact that, once appointed to such a staff position, the individual, for all intent and purposes, loses his nationality. He must be loyal to the Supreme Commander and direct his efforts towards the accomplishment of the over-all theater mission.

2. The staffs of the other Deputy Supreme Commanders and their relationships

in the over-all organization are similar to those indicated for the Deputy Supreme Commander for Navy. These staffs are limited to the minimum essentials necessary for the co-ordination of the operations of their respective services, theater-wide. Since theater military operations are normally conducted by zone commanders, and service and supply activities are on a national basis co-ordinated by the Theater Combined Logistics Officer (C4), there is no requirement for three additional theater operating headquarters. In periods of emergency, when allied forces must be massed by type regardless of nationality, this staff is sufficient for the Deputy Supreme Commander to assume temporary command.

3. The organization of all staff sections is similar to that of the Theater Combined Operations Officer (C3). Each major staff section is divided into as many subsections as there are zones of operations. These subsections are joint in nature and include representation from the appropriate armed forces of the members of the regional coalition, with consideration to the amount and the nature of the forces contributed.

4. The Theater Special Staff is com-

posed of sections representing activities which have theater-wide implications, to include Air Defense, Psychological Warfare, Transportation, and Telecommunications. In addition, it includes any other activities over which the Supreme Commander desires to retain personal control.

Conclusion

After viewing the many problems of coalition warfare, it becomes obvious that any organization, no matter how well conceived and designed, will stand the strains of war only to the extent of the type and kind of people in it. It is, therefore, vital that all members of a present or of a potential coalition of nations school themselves to view the problems of their allied partners with patience, respect, and understanding. General Eisenhower, in commenting on the success of his command organization in Europe, made the remark that once individuals with the necessary ability were positioned in the organization, it was the unstinting co-operation of the Allies, more than any other factor, which made success possible. The keystone of successful combined warfare is still, and always will be, CO-OPERATION.

NEXT MONTH

Main Articles

The seven main articles include *Large-Area Screening in the MTO and ETO* by Dr Paul Prichard; and *The Logistical Command* by Colonel George Reinhardt.

Foreign Military Digests

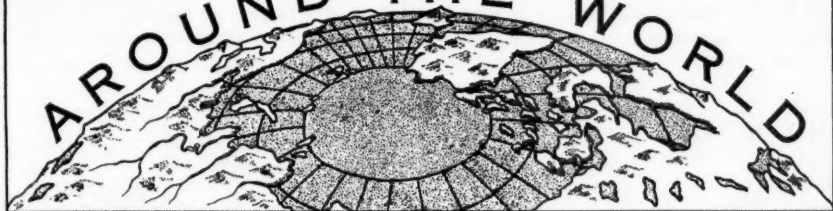
The foreign digests include "The Battle of the Mareth Line" from the *Australian Army Journal*; and "Soviet Night Attacks" from the *Revue Militaire d'Information*.

Books for the Military Reader

Reviews of *Captain Sam Grant* by Lloyd Lewis and *The Price of Survival* by Brig. Gen. Joseph B. Sweet, USA (Ret.), plus a listing of other books of interest.

MILITARY NOTES

AROUND THE WORLD



UNITED STATES

Portable Shelter

A portable tent in which even the tent poles are made of glass-fabric nylon is the latest addition to a growing list of portable shelters being developed for use by the various branches of the Armed Services.

The large impregnated-fabric shelter was developed by the B. F. Goodrich Company for use as a field photo laboratory. Laboratory engineers point out that the new structure is waterproof, fireproof, and will not admit light. The tent covering, which comes in sections, is zipped together over supporting members which are actually air tubes made of the same material as the cover. These low-pressure tubes can be inflated by an air pressure of 3 pounds, and the entire shelter can be erected by a crew of six men in approximately $1\frac{1}{2}$ hours.

When set up, the shelter measures 80 feet long, 20 feet wide, and 16 feet high. It weighs 750 pounds, can be packaged into a space measuring 10x4x4 feet, and is completely air portable.

Stability of the tent has been demonstrated in winds up to 40 miles an hour. Although its primary uses at present are as a field photo lab or a briefing room, it can also be adapted to a variety of other uses.—Air Matériel Command.

Shock Waves

A high-speed camera is being used at Aberdeen Proving Ground, Maryland, to record shock and vibration waves produced by explosives.

Constructed as an aid to research, the camera takes photographs at 100 million frames per second. It is used to photograph waves moving at a speed of 8,000 meters per second.

The camera is expected to be of assistance in the design and development of future weapons, but it may also be used for the study of "detonation knock" in internal combustion engines.

An explosion produces a well-ordered pattern from detonation to shock. Though this period lasts for only millionths of a second, the velocities created are one-quarter inch in one-millionth of a second. This velocity can be studied by means of the camera.

A framing grid and a rotating mirror make possible that high-speed action. The grid is a focal plane shutter consisting of a series of narrow, parallel, optically clear slits, cut at uniform intervals through an opaque plate.

The width of the slit determines exposure time, and the ratio of space-width to slit-width determines the number of successive independent frames.—*Armed Force.*

Pentagon Phone Maze

The huge Pentagon building, headquarters of the Department of Defense, has the largest and busiest private branch telephone exchange in the world. Some 225,000 interoffice calls and 90,000 outside calls are handled daily in normal times by the exchange, which contains 68,600 miles of trunk lines.—*The New York Times*.

Water Fog

High-pressure water fog fire-extinguishing systems are effective in killing "spill fires" of gasoline on a concrete test slab, it has been determined at the Army Engineer and Development Laboratories at Fort Belvoir, Va., where recent tests have just been completed. High-pressure equipment was found to be four times as effective as low-pressure units.

In these tests, the superiority of high-pressure over low-pressure fog was established, with somewhat less notable but equally significant results, at low rates of discharge. Average extinguishment time at 15 gallons per minute was 26 seconds for 1,500 pounds pressure, and 52 seconds for 100 pounds pressure.

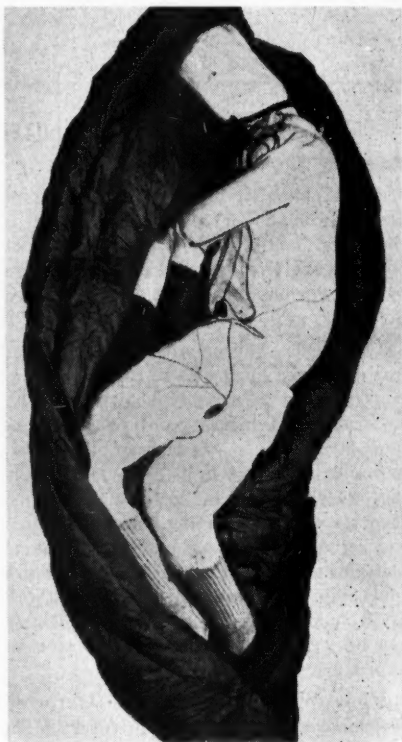
Using high-pressure nozzles especially constructed to deliver 35 gallons of fog per minute at 1,500 pounds per square inch pressure, fire fighters succeeded in extinguishing a series of 10 test fires in an average of 9 seconds. Pressures this high, however, make handling the nozzle difficult. Subsequent tests using 500 to 1,000 pounds nozzle pressure gave average extinguishing time of 13 and 10 seconds, respectively.

Principal advantage of water fog in combating fire is that of water economy, the engineers assert. This is an important consideration in military fire-fighting equipment for use where water is scarce. Used against liquid fires, fog has the added advantage of not scattering the burning fuel.—*Science News Letter*.

"Lumpy"

A life-size dummy named "Lumpy," is giving the Army Quartermaster Corps the latest information on the types of design and dimensions of sleeping bags which give the best protection against external cold.

"Lumpy's" long-handled underwear is

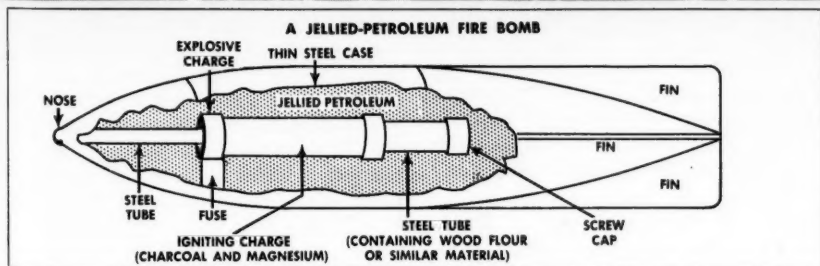


The dummy, "Lumpy," answers sleeping bag questions.—Department of Defense photo. lined with electrical heat units. Controls make it possible to increase or decrease the amounts of heat at any section of his body. The tendency of his internal stuffing to bulge in unpredictable places caused him to be dubbed "Lumpy."—Department of Defense.

Napalm vs Tanks

Napalm bombs have been used with great success in air attacks against North Korean tanks. These bombs are made by adding a chemical thickener to gasoline, which turns it into jelly consistency. The

ticularly effective against truck convoys, buildings, and wooded areas. However, because of its clinging qualities and the unbearable heat generated, it is a very effective antitank weapon. Used against



US *Mustang* fighters use napalm bombs against North Korean Russian *T-34* cruiser tanks. Schematic drawing shows the construction of the incendiary napalm bomb.

bomb contains a fuse, igniting charge, and explosive detonator. The bomb bursts on contact with the target, throwing the flaming jelly in all directions. It is par-

ticularly effective against truck convoys, buildings, and wooded areas. However, because of its clinging qualities and the unbearable heat generated, it is a very effective antitank weapon. Used against

Radioactive Zone

Plain, old-fashioned "elbow grease" is still the best and perhaps the only way to decontaminate an area "hot" with radioactivity, service experts have learned.

Hard and persistent labors, such as sand blasting, scrubbing with detergents, and washing down with foamite, are some of the methods used by the Navy in purifying contaminated areas.

There are two little-known installations in San Francisco, both operated by the US Navy with the assistance of the other services and used by all the services, that are concerned with the problem of radioactivity.

One is the Naval Radiological Defense Laboratory which is part of the San Francisco Naval Shipyard at Hunters Point. The other facility is the Radiological Defense School, part of the Navy's Damage Control Training Center on Treasure Island in San Francisco Bay.

These two facilities really grew out of the Bikini atom bomb test. After that test, the need for passive defense measures against radioactivity was obvious.

The Navy had a lot of Bikini target ships, some of them only slightly damaged but many of them "hot" with radioactive particles. These not only offered floating laboratories of great importance for the study of radioactivity but they either had to be disposed of or cleaned. Hunters Point was given this job and the Naval Radiological Defense Laboratory, which works with and for all the services, came into being.

Today, all the "hot" ships of Bikini except one have either been sunk or decontaminated and returned to the fleet. The single ship still "hot," though only slightly so, is the carrier *Independence*, whose upper works and flight deck were torn and twisted by the blast of the atomic bomb. Her main engines have been de-

contaminated and are now used as a power plant at the Naval Missile Test Center, Point Mugu, California. The ship's battered hulk still lies at a Hunters Point pier, a floating laboratory for research into the phenomenon of radioactivity.

Another practical laboratory in the study of radioactivity was inadvertently established last January when a tiny phial of powdered radium sulphate, used in the Damage Control Center's 6-weeks radiological defense course was spilled. Before its loss was detected, it had been trampled throughout a laboratory building and tracked into the automobiles of some 150 students and instructors, thence into apartments and homes all over San Francisco. Contaminated shoes and uniforms had to be destroyed, samples of the breath of all involved personnel were taken, and apartments and automobiles were given the most thorough cleaning on record.

The problem of decontaminating a radioactive area as one officer expressed it is "moving the contamination from one place to another" for there is no known way to neutralize radioactive particles. Any porous or absorbent material like manila cordage or concrete is extremely difficult to decontaminate. The particles penetrate it or stick to the surface. Coatings that present a fine, glazed, smooth surface, from which the particles can be easily washed, are some protection.

Despite the problems of radioactivity most of the experts feel that as a menace to military forces it has been exaggerated. From 85 to 90 percent of those who would be killed by the radioactivity of an atomic bomb explosion would die, in any case, from blast or flash burns. Moreover, a bomb bursting in the air normally leaves little persistent radioactivity on the ground. Troops and ships could quickly move through the bombed area.—*The New York Times*.

Latest Liaison Plane



The US Army has ordered a substantial quantity of *Cessna 305* liaison-observation aircraft, above, to replace present models. The 305, a high-wing, all-metal, single-engine plane, has been designated the *L-19*. It is capable of a top speed of 150 mph and an observation speed of 50 mph.—Department of Defense photo.

Cool Jets

An air-conditioning unit weighing only 20 pounds and capable of cooling the cockpit of a high-speed fighter plane to sea level temperatures is being manufactured by Hamilton Standard Division of United Aircraft Corporation, East Hartford, Connecticut.

The need for some means of cooling the cockpits at sea level has proved equal in importance to the need for pressurization and heating at high altitudes. The new unit delivers a 120-mile-an-hour flow of air to the fighter's cockpit, changing its 60 cubic feet of air every 15 seconds. Without air-conditioning, modern fighter cockpit temperatures reach as high as 190°F.

The problem of providing cooling or heating air for jet fighter cockpits is solved by three basic units and a simple control valve. A thermostat in the cockpit, which the pilot can set to his temperature requirement, regulates the operation.—*The New York Times*.

Stock-piling

The national stock pile of critical and strategic materials on hand and on order now amounts to a little over 50 percent of the estimated 4 billion dollar goal. Appropriations before Congress will increase this to about 57 percent by 30 June 1951. Purchasing programs for 13 materials are either fully accomplished or nearly so. These materials are antimony in liquated, metal, and ore forms; metal grade bauxite; celestite; emetine; graphite (amorphous lump); hyoscine; iodine; lead; mica (muscovite splittings); quinine; and sperm oil. Procurement for the stock pile during the 1950 fiscal year lagged somewhat behind the rate established during the previous year. This was due, in part, to the difficulty in obtaining materials because of heightened industrial activity. In particular, stock-pile schedules were not met in rubber, copper, and zinc.—*Armed Forces Chemical News*.

8,350 Jeeps Ordered

Willys-Overland Motors recently announced receipt of an order from the United States Ordnance Corps for 8,350 Jeeps, the aggregate cost of which will be \$22,291,330. The order, largest placed with Willys-Overland in 5 years, nearly doubles an order placed with the company by the Army in June 1949 for 4,000 Jeeps and parts at a cost of \$12,139,500.

The new Jeeps, like those ordered last year, will be a development and improvement of the wartime model. The new model, known as the *M-38*, is designed to ford streams at depths completely submerging the vehicle and to perform at maximum efficiency under extremely high and low temperature conditions. They will also be equipped with an electrical system adapted to operate short wave radios developed for tanks in World War II.—*The New York Times*.

New Steel Process

Better, cheaper shells for gunfire are made by a process developed in Germany before World War II and now in use in the United States by both Army and Navy Ordnance departments. The shells are made by cold extrusion of steel, instead of by conventional forging.

Shells made by this cold extrusion process are more accurate when fired.

A 40 percent reduction in shell-steel needs may be expected with the new process. About 960,000 tons of steel can be saved in machining 100,000,000 shells of 105-millimeter size, and, in addition, 12,500 tons of manganese will be saved.

Another advantage of only slightly less importance is the saving in machining operations. Three simple machining operations are the most that would be needed on an extruded shell body. A relatively simple single-purpose machine could probably do the whole job in one setup.—*The New York Times*.

Artillery Detection

Concerned because there is at present no United States or known foreign equipment capable of meeting adequately the need for a device to locate hostile artillery, the US Army plans during the 1951 fiscal year to spend about 2½ million dollars for development of a detector. A Congressional committee has been told that "due to the small size, high speed, and flat trajectory of artillery shells, the problem is one of extreme complexity and will be difficult to solve. In view of the known characteristics of certain artillery and the doctrine of mass artillery fire, it is essential that some type of equipment be developed so that enemy guns may be located and destroyed."—*Army Navy Air Force Journal*.

Guided Missiles Program

The US guided missiles program is out of the research and development stage and is now in the engineering stage according to a report by the chief project engineer for guided missiles at Douglas Aircraft Company. He defined the "engineering stage" as that phase of progress during which the output of research and development laboratories is studied and evaluated to select for further investigation ideas which appear to be economically sound.

After describing the four principal classifications of missiles—ground-to-air, air-to-ground, air-to-air, and ground-to-ground—he said: "We are now asking ourselves whether these various types of missiles will best accomplish the task for which they are intended." The engineer pointed out that the Germans, enamored of the missile as a "super weapon for a super race," devoted a great deal of energy and time to the development of rockets. "Had they placed as much emphasis on aircraft," he said, "they may have had a better chance of winning the War."—*Army Navy Air Force Register*.

Automatic Chute

A parachute with a built-in brain has come from the laboratories of the Air Matériel Command. It is a new automatic back-type model that knows when and where to open in high-speed, high-altitude bailouts.

The new parachute takes the bugaboo out of free-fall drops. It requires only that the pilot get out of his plane and pull a handle connected by cable to an automatic release. The release then takes over,

feature over which he expects to fly. For example, if the highest point on the terrain is 8,000 feet, he sets the release for 13,000 feet. Then, should it become necessary for him to bail out at 40,000 feet, his chute will not open until he free falls to the preset altitude of 13,000 feet.

This feature corrects several of the old ills of parachute escape. At 40,000 feet, the opening shock is four times as great as it is at sea level. Also, if the chute



By setting two dials prior to take off, above left, a pilot needs only to pull a handle, above right, and the mechanism will automatically open the chute.—USAF photo.

opening the chute only after the airman has fallen to a safe altitude.

The automatic release controls the opening of the parachute based both on the altitude of the plane at the time the airman jumps, and the speed of the plane.

Before the pilot takes off, he sets a timer, usually between 5 and 7 seconds, and an aneroid element for an altitude 5,000 feet higher than the highest terrain

were to open at 40,000 feet, the descent would take longer and lack of oxygen or the extreme cold of high altitudes could prove fatal.

Should a pilot be forced to bail out at high speed and low altitude, the timer will provide a sufficient delay for him to clear his plane and slow down to a safe speed before the chute opens.—Air Matériel Command.

Aerial Camera

A camera that photographs a 26-mile strip of the earth in 2 seconds from a plane flying at 10,000 feet has been developed by the Air Force. The 26-mile strip is about 3 miles wide. These distances can be increased by taking the photographs from a higher elevation. The camera eliminates processing of two rolls of film, since it could replace cameras which provide horizon-to-horizon coverage by making three pictures: the area directly beneath the plane, and the areas ahead and behind the plane.—*The New York Times*.

"Photo Plastic"

Engineers in military, university, and industrial laboratories here and abroad are obtaining "internal vision" by means of a new plastic that is capable of being made into exact size models of machine parts and tools.

The new "photo-plastic" is helping research workers in gun factories, airplane engine plants, arsenals, naval laboratories, and universities in designing stronger machinery and equipment. Plastic models help scientists to get a "portrait in color" of the strains encountered in tools, machine tools, and other objects.

The plastic can be cast in chunks 10 to 20 times larger than any resin formerly available for such strength studies.—*The New York Times*.

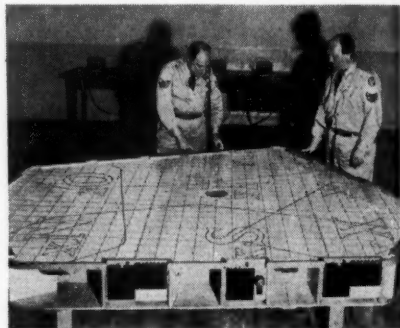
Military Government

The Army's first resident instruction in military government to be offered since the close of the World War II period will be given next year at The Provost Marshal General's School, Camp Gordon, Georgia. The new 30-day course will be open to all officers of the Regular Army and the civilian components. Two classes are scheduled for 1951, with the first opening 15 January and the second beginning 28 May.—News release.

Air Raid Table

The plotting table to be used in charting the flights of any enemy planes over New York City and 17 nearby counties of this State (New York), New Jersey, and Connecticut was unveiled recently.

Outwardly the table is a simple affair, but inwardly it is as complicated as any



Air Force staff sergeants check positions on new air raid plotting table.

large telephone switchboard. It is about 6 feet wide and 9 feet long, around which are 12 telephone keyboard positions for volunteers who are to receive plane reports from observation posts in the 22 counties of New York State.—*The New York Times*.

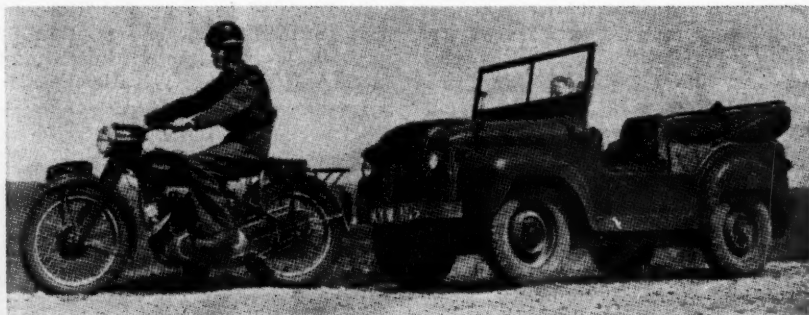
New Electricity Source

The relatively rare metallic element known as germanium is united with nitrogen in a process to form a material that will give off electrical energy when subjected to light or heat.

This germanium-nitrogen union, which might be regarded as a type of alloy, is usable in devices replacing the photoelectric cell. Other alloys of germanium, for which patents are pending, may be used as rectifiers to convert alternating electric current to direct current. They are usable also in new devices to replace vacuum tubes in radio and other electronic applications.—*The New York Times*.

GREAT BRITAIN

New Vehicles



Prototypes of two vehicles to be added as standard equipment for the Services were demonstrated recently by the Ministry of Supply. One is the *Hybrid* motorcycle, above left, and the other is the British Jeep, above right. Contracts for producing the Jeep have already been awarded.—*The Services and Territorial Magazine*, Great Britain.

CANADA

Testing Radar

Canadian officials recently announced preparations for action-testing of new ultra-sensitive radar devices that may be used by the Allied navies if there is a third world war.

The National Research Council, which handles most of the Government's scientific experiments, said the *Radel II*, a submarine chaser specially equipped for radar experiments, would sail from Prescott, Ontario to give the new device a 3-week trial on Lake Ontario. The ship carries a new fast-sweep high-definition radar, which has a greatly expanded picture and an improved minimum range over commercial models.

Other devices to be tested included radio direction-finders and a depth-recording apparatus.

A defense official, while reiterating that the new radar set was not designed primarily for military use, said it was of the type that would be used to arm other North Atlantic Pact nations in the event of another war.—*The New York Times*.

AUSTRALIA

Compulsory Military Training

The Australian Defense Council has decided to institute compulsory military training next year, by calling up about 13,000 men in the 18-year-old group. Commentators predict, however, that the plan cannot be put into effect before the middle of 1951, because of the shortages of accommodation and instructors.

Military authorities estimate that the number of trainees in this group will increase gradually to 21,000 in 1954. It is planned that call-ups will be staggered to prevent taking too many youths out of industry at one time.

A former Chief of the General Staff, commenting on the decision, said that an amendment of the Defense Act to allow soldiers to be sent overseas was still urgently needed. Army policy has been not to send men overseas before they reach 19, and then very rarely to put them into action at that age. If war came suddenly, Australia would again have to rely on volunteers who had served in the 1939-1945 War.—*Australian Weekly Review*.

USSR

New Russian Jet

According to various reports, a new jet fighter plane, designed by Yakovlev and bearing the designation of *Yak 21* is being introduced into the Russian Air Force. The new model is a low-wing, single-engine plane with swept-wings and possesses a certain resemblance to the North American *F-86*. The armament of the plane consists of four 20-mm automatic guns. Maximum speed probably exceeds 620 mph.—*Flugwehr und -Technik*, Switzerland.

Anti-Soviet Element

A high State Department official said recently that 60 to 90 percent of the "captive populations" of the Soviet satellites were opposed to their Moscow rulers.

Edward W. Barrett, Assistant Secretary of State for Public Affairs, said that Stalin has failed completely to win over the satellite populations even though he has them under his complete control.

"Despite 4 years of intensive Soviet propaganda, any informed visitor will tell you that between 60 to 90 percent of the captive populations are today anti-Soviet," he said.—*The New York Times*.

Baltic Fleet

The Commander in Chief of the Swedish Navy, Vice Admiral Strombach, stated recently that the expansion of the Soviet Baltic Fleet was far in excess of normal defensive requirements. The Eastern bloc had, in the Baltic, 1 battleship, 5 cruisers, 3 torpedo cruisers, about 15 large and 10 small destroyers, about 100 motor torpedo boats, 100 submarines, and 200 minesweepers, with a naval air force of 600 to 800 planes. There was also a large construction program.—*Journal of the Royal United Service Institution*, Great Britain.

NORTH KOREA

Fighters in Use

Command of the air during the early phases of the Korean campaign helped UN forces to slow down the North Korean advance and provided valuable time for



building up reserves of men and equipment. The North Koreans provided only sporadic air opposition, generally with their Russian-built *Yak 9*, above; *La 7*, center; and *Yak 3*, below.—*The Illustrated London News*, Great Britain.



The Arctic Winter

JM

Digested by the **MILITARY REVIEW** from an article by Major
H. B. O'Sullivan in "The Tank" (Great Britain) April 1950.

AFTER spending 7 months journeying some 20,000 miles in Alaska and Northern Canada, it is difficult to convey one's many impressions in a few words. Especially is one diffident about setting oneself up as an Arctic expert in a field where so much is as yet only tentative thought and conjecture. Particularly in view of our having been so repeatedly warned against the so-called expert who, having spent merely a few days in the northlands, returns to civilization with a super-abundance of the "know-how," but with precious little capability.

Generally speaking, the Arctic is defined as the area north of the tree line, and the sub-Arctic, as those regions south of this line, but north of the developed areas. It is largely composed of frozen wastelands, subject to intense cold, often between -30° to -40° F., occasionally going below -50° F. and subject to high winds with severe chilling effects.

This combination of low temperature and air movement is expressed in terms of "windchill." For example, a temperature of -7° F., with a wind of only six miles an hour, gives a "windchill" figure of about 1,400, at which figure all exposed flesh freezes and is liable to frostbite. When

one realizes that winds of 60 miles an hour and windchills of 2,300 are reached in parts of the Canadian Northlands, one obtains some idea of the intensity of such cold at its worst.

The igloo is the snugest and most secure shelter under bad conditions, and happily, can be quickly constructed with large snow-blocks after very little practice. It is normally entered by an underground tunnel, leading away from the prevailing wind, and usually blocked up once inside. Then a tot of rum, sometimes frowned on, but invariably indulged in, certainly goes a long way to improve the general rosiness of one's outlook.

Mild frostbite of the face and ears may occur several times a day, and is thawed out by holding the bare hand or the pile on the back of the Arctic mitten against the place affected. A well-trained man with good circulation should *not* become a casualty from frostbite. An important part of the general picture is the serious loss of manual dexterity caused by cold hands and bulky clothing, and one's natural reluctance to carry out any task which involves additional exposure to the cold. The lowest North American temperature, -83°

F. (115° below freezing point) was recorded in the Yukon in February 1947.

Special Arctic clothing is essential to keep out the bitterly cold winds, and at the same time allowing for ventilation to prevent perspiration from turning into ice next to one's skin. Special rations with a high fat content, quite nauseating under ordinary circumstances, are gulped down with relish, giving immediate energy and warmth. Hot drinks can never come too



Above, typical Barrenland terrain; below, in the tree belt, the climate is milder and shelter is available.



often. Preparation of food, however, is tedious, as all rations freeze rock hard and take time enough to thaw out, let alone to boil. Water is normally obtained by heating snow or ice.

In spite of all this, the Arctic has a strong appeal, and the extreme cold of the "barrenlands" contrasting with the often beautiful scenery to be found within the tree line, definitely urges one on to pit

oneself against nature and get a kick out of it.

Such intense cold plays queer tricks with machines as with men. At -30° F., for example, gear oils solidify and ice forms on the inside of steel tracks, stripping the rubber off bogie wheels after a few days' traveling. Batteries lose more than half their efficiency, engines refuse to start, and rubber becomes hard and breaks. Even the trees become so brittle that they often snap when struck by tracked vehicles. Nevertheless, using special Arctic lubricants and oils, tanks can be started and run for short periods in temperatures down to -40° F. and below, at which temperatures tank guns and machine guns can also be used. These are normally fired with the frictional surfaces dry, since lubrication makes them too sluggish. Under conditions of extreme dry-cold, metal surfaces fortunately do not rust.

Such conditions impose various limitations. All movement is slowed down in deep snow; exhaust vapor can be seen for many miles; noise travels much farther than usual and tends to prevent surprise. "Obscuration," although rare, may also present a tricky problem. It is caused by anything generating heat and moisture, such as the engine exhaust, or firing of the main armament or machine guns, and takes the form of a fine vapor-like fog. With a cross wind, it is quickly dissipated, but with a large caliber gun it may completely obscure the target from the gunner. Lenses of telescopes also fog over; on the outside due to heat from gun-blasts, and on the inside due to heat of the gunner's eye and breath.

Problems of maintenance still have to be tackled, since metal at low temperatures becomes "tacky" to the touch, and skin coming into firm contact with it will stick and come off, leaving the hand with much the same effect as a burn. When in contact with cold-saturated steel, one's hands rapidly chill. Warming frozen tools with

blow torches has, on occasion, proved successful. However, a proportion of portable maintenance shelters, to exclude the wind, which can also be heated to above zero, is essential. Small pocket chemical hand-warmers also help.

It has been found that light tanks with wide tracks, having a ground pressure of 6 to 7 pounds per square inch, have considerable mobility as the frost deepens in mid-winter, in areas where marshland and lakes abound. Neither deep powder-snow nor hard-packed snow present serious obstacles, as such tanks can either go round or "bull" their way through snowdrifts up to 6 feet in depth for limited distances. Similarly, they can frequently push their way through the sub-Arctic tree belts. There are also large, open areas where the average depth of snow is less than 2 feet, over which tanks can operate freely. A minimum thickness of 18 inches of freshwater ice will support a tank of 20 tons. The lake ice, however, during mid-winter is usually at least 4 feet thick, and will generally support the *Sherman* tank. Column distances on such occasions become matters of importance, since the noise of cracking ice is somewhat disturbing. In view of this, the increased fuel consumption of heavier tanks, and the enormous distance all supplies of fuel and ammunition may have to come—often many hundreds of miles—it would seem that the farther north they go, the more will weight of tank and gun give way to lightness and mobility.

Although large-scale operations appear unlikely in the Arctic, due to the enormous difficulties of supply, the increasing

importance of the northern polar air routes would seem to render vital the ability to construct, maintain, and hold the various air fields, bases, and meteorological stations required.

It is in such roles as these that the tank might prove invaluable, particularly since the shock action of armor in the Arctic, where it is practically impossible for infantry to dig fox-holes, is likely to be considerably greater than elsewhere. Two men working 4 hours were only able to penetrate 9 inches while digging weapon pits in frozen ground. The explosion of heavy "Beehives" also often proved ineffective. The tank would also seem to provide the best safeguard against enemy airborne attack in this theater, where the war would appear to be predominantly an air war, and consequently a struggle for islands and bases.

Much experimentation and development has yet to be undertaken to enable the tank and its crew to function efficiently under conditions of snow and extreme cold. Notwithstanding its present shortcomings with regard to starting and sustained operation, one can even now clearly see that the tank could play an important part in northland operations. Anyone fortunate enough to take part in such development, will find it an enthralling subject, and an experience, which however "rugged" at the time, they would certainly, in retrospect, never have missed.

The progress being made has also a direct bearing on the problems which would have to be faced in the event of a winter campaign in any other cold country.

Guided Missiles

Digested by the MILITARY REVIEW from an article by Major G. A. Johnston in the "Australian Army Journal" December-January 1949-1950.

IN PEACE or war, the development of new weapons and the improvement of existing ones goes steadily on. Each new weapon produced challenges scientists to devise first, a means of countering its effects, and second, means to better its performance for use by their own services against potential enemies. Thus, since German scientists produced the V-2 rocket for carrying large quantities of explosive long distances as a substitute for expensive aircraft, British and American research workers have concentrated on developing remote-controlled guided weapons of greater accuracy, reliability, and effectiveness.

Recording Performance

Since the War, a number of improved missiles have been flown, but scientists are still interested in simplifying the design and improving the performance, accuracy, and reliability of guided weapons. The collection of data which will ultimately lead to the solution of these problems requires accurate measurement of the performance of the missile under test, from the time it is launched until it has completed its flight. This collection of performance data is carried out from ground stations located on the line of flight of the missile, by special cameras and other optical recording devices, by radar tracking, or from radio signals transmitted by measuring equipment within the missile. Great progress has been made in this direction. It is now possible to record, by one or other of the methods mentioned above, most of the information required to assess the efficiency of the mechanisms contained in the missile.

Besides being collected at the ground stations, much of the required data may

be recorded graphically inside the missile during flight, so that comparison of these records with those obtained by the ground-tracking devices decreases the chances of undetected error in one or other of the recording systems. From this information, the designers can see whether the various parts of the missile functioned according to plan. If they did not, the cause of the shortcomings can be located and alterations made to improve the design.

The calculation of the missile's performance from the mass of data recorded from each firing would be a tedious task if workers were wholly dependent on the usual mathematical processes. Fortunately, a number of electronic and other high-speed calculating machines have been built which are capable of handling, in a few days, calculations which otherwise would take many months to complete. These have proved useful tools to scientists engaged on guided missile projects, enabling them to analyze speedily the results of missile firings and thus avoid delays in development.

Long-Range Proving Grounds

As the range of guided missiles increases, so does the need for larger proving grounds. Land ranges have the advantage that stations for instrumentation can readily be established, and fired missiles can be recovered for subsequent examination. The problem is more difficult with ocean ranges because ships must be used as bases for tracking apparatus and fired missiles cannot be recovered. Australia is particularly fortunate in this respect as the Woomera range extends for 1,200 miles over uninhabited country and, if necessary, may be still further extended into the Indian Ocean.

Although the United States has a number of well-equipped proving grounds for guided missiles, none of these is adequate for testing the long-range guided weapons. Much consideration has been given to the selection of a safe site for this purpose, and finally Congress established a proving ground with the range-head at the Banana River, Florida, extending over the Bahama Islands to a point 3,000 miles southeast in the Atlantic Ocean. It is believed that sites will be established for the tracking of missiles over the first 500 miles of their flight.

Recent Performance

It will be of interest to examine some of the recent American accomplishments in the guided missile field which indicate, first, the desire to obtain basic information regarding performance with a view to improving design, and second, the trends in the future employment of guided weapons.

A twin missile consisting of a V-2 and a smaller missile known as a *WAC Corporal* was projected vertically to a height of 250 miles. The smaller rocket about 12 feet long and weighing 700 pounds was mounted in the nose of the V-2. After the latter had reached the highest point of its trajectory, the *WAC Corporal* was ignited and separated from the V-2 to continue the flight under its own power to the greatest height ever reached by a man-made object. The twin rocket was tracked over the whole of its trajectory, but, although the remains of the V-2 were recovered about 20 miles from the launching point, the *WAC Corporal* has not so far been located. It is thought that, due to the velocity with which it was traveling when it hit the ground, it has buried itself in the desert.

It is obvious that the recording instruments mounted in such a missile provide a wealth of information about conditions in the upper atmosphere. Much of this data will probably be applied in the design of future high-altitude missiles and will also

be of great value to scientific workers investigating upper atmosphere phenomena.

While the principal reason for firing the two-stage missile described above was to obtain information about hitherto unexplored regions of the earth's atmosphere, it must not be thought that the guidance of weapons by remote control has been neglected. Much work has been done on this problem, and missiles have been developed which can be launched in one direction and then made to change direction at will in order to hit a preselected target. These are true guided missiles as opposed to those of the V-2 type which are guided by preset controls and whose direction cannot be changed in flight.

Besides ground launched missiles, attention is being given to launching weapons from sea-going craft, particularly submarines, with the intention of guiding the missiles to targets well inland in the enemy's territory. Successful launchings have already taken place in the United States from both submarines and surface ships. In the latter case, a V-2 was launched. This problem is somewhat more difficult than launching missiles from ground sites, since the ship is a moving platform and corrections must be made for errors due to pitch and roll of the vessel during launching. Also, some protection must be provided to counter the fire hazard from the motors of missiles during launching.

It is not known whether underwater launching of missiles from submarines is practicable. In any case, guidance of a missile by a submarine relatively close to the target will give far greater accuracy than if the weapon had been launched from a land base hundreds of miles from the target. It would also allow the use of smaller missiles with a greater ratio of explosive to total weight, than would be the case if longer range weapons carrying large quantities of fuel were necessary.

Trends in Missile Navigation

One of the most difficult problems has been accurate navigation of missiles because, although guidance techniques have been greatly improved, the necessary degree of accuracy for the longer-range weapons is difficult to achieve. It will readily be seen that some method must be used which keeps full and accurate control of the missile till it reaches the target, and at the same time, compensates for errors in range and direction which are introduced by the behavior of the missile during flight, by movement of the target (e.g., ships at sea), and even by the rotation of the earth. Radar guidance or pre-set controls do not overcome this difficulty and an attempt has been made to guide long-range missiles by electrical navigation, the missile obtaining a "fix" from two stars by a method similar to that used in aircraft navigation. The error signal would, of course, be transmitted to motors which operate the controls of the missile.

Where Next?

It is not surprising that having produced missiles which can be projected close to the upper limit of the earth's atmosphere, scientists should turn their attention to the conquest of the regions beyond. As a preliminary, press reports from America indicate that scientists and defense authorities are toying with the idea of establishing an earth satellite. Such a station might be used as an observation post for the collection of information about that part of the universe we call space, or as a base for the launching or control of guided missiles directed against earthly targets. It must be stressed, however, that no official statements have been made about the possible military uses of such a station. The satellite would have to be built in sections, preferably at a distance of 22,300 miles from the earth. It could be so located as to revolve about

the earth once in every 24 hours, being pulled along by gravitation and thus always hover above the same spot on the earth's surface.

It is believed that in such a station, observers might live in a sealed room by breathing a compressed oxygen mixture from a tank. However, at such a distance from the earth, the force of gravity would be almost nil, so the effect of weightlessness on the physiological organs is one of the difficulties which would have to be overcome before such a scheme would be practicable.

Assuming that such a satellite could be constructed, it might not be necessary to man it, particularly if it were designed purely for the collection of scientific data. Much of this might be recorded and transmitted by automatic radio sets, which would signal to the earth information of the type, at present, transmitted by radio sets in sounding balloons.

The difficulties of such a project appear insuperable, but when we remember that only a few years ago, long-range guided missiles were thought to be beyond the bounds of practical possibility in our lifetime, it is possible that the present generation may see this project completed.

Conclusion

We have examined in broad outline the trends in present day guided missile development. So much has been accomplished in this field in the last 20 years, that research workers are looking further and further ahead towards improvements in missiles and techniques which were not even imagined when the projects were first initiated. However, the problems which confront research workers and designers trying to create the perfect guided missile are many and difficult, and we may expect many conventional improvements before the ultimate in guided weapons is produced.

The Dirty Work

Digested by the MILITARY REVIEW from an article by Major General F. Kingsley Norris, Director General of Medical Services, Australia, in the "Australian Army Journal" December-January 1949-1950.

WE HAVE seen the important and often decisive part played by disease in the history of the world. The shock troops of this army have been malaria, dysentery, typhoid fever, typhus, smallpox, and scurvy, but there are the snipers—influenza, upper respiratory tract infection (URTI), meningitis, and sores.

None of these diseases is peculiar to armies and, with the exception of smallpox, all are present in Australia. But in times of war, especially in countries where these diseases have a high incidence, they assume an increased importance. On the other hand, many diseases which are prevalent among the civil population have a low incidence among troops.

Under the conditions of great physical endurance, low diet, strain, and continual soaking associated with the campaign in the Owen Stanley ranges, the URTIs, the common cold, and pneumonia were rare, and so also were the acute surgical emergencies of civil life.

The significant diseases of war may be classified on a casual basis into three broad groups:

1. Those due to dirt.
2. Those due to insect and animal carriers.
3. Those due to rigors of war.

A host of communicable diseases are brought about by dirt—dirty air, dirty food, and dirty skin.

Dirty Air

When anyone talks aloud, a fine spray from their nose and throat is tossed into the air for a distance up to 6 feet. Coughing and sneezing increase this range. In the open, the currents of air rapidly

disperse this cloud, but in a closed space such as a room, any other person within this spray range receives these fine particles and breathes them into his own nose and throat, and these particles always contain bacteria. Not all bacteria are harmful.

Life on this earth would have become impossible long ago if bacteria had not rid us of our rubbish. Many of our manufacturing processes are dependent on bacterial activity; beer, butter, and cheese are just three of such pleasant products. There are, however, dangerous and deadly bacteria, and those unfortunate people who harbor such in their noses, throats, or lungs are a menace to others within their spray or droplet range.

In this manner are spread the common cold, URTIs, sore throat, influenza, scarlet fever, diphtheria, measles, meningitis, infantile paralysis, tuberculosis, infective jaundice, and a host of other common diseases. With certain of these diseases, active bacteria may remain in the nose and throat long after the disease they have produced has subsided. There are always these "carriers" in any community.

The many hundreds of different bacteria are distinguishable by magnification—each has its characteristic size and shape, its own habits of growth, feeding, and living. Now with the electron microscope giving a magnification of 60,000, the minute virus responsible for many of our common ills are coming under close scrutiny.

Dirty Food

Certain bacteria responsible for bowel infections have to gain admission to the body through the alimentary tract before

they can do their dirty work resulting in diarrhea, dysentery, or typhoid fever. Certain of the spray or droplet group of bacteria may also ride in on the "Trojan Horse" of food—scarlet fever and infantile paralysis are two of these.

Food in its natural state is sterile, but with handling and on exposure to air, it inevitably becomes contaminated with bacteria. Most bacteria are destroyed by adequate cooking, and most of the bacteria conveyed by handling are relatively harmless. If in the vicinity of food, however, there is infected refuse or a person who has been infected with dysentery or typhoid fever, the danger is great, as these organisms are excreted in an active stage from the bladder and from the bowel. Again, unfortunately, long after the infected person has recovered from the acute illness, these active organisms may persist in the urine and in the faeces of these carriers. In Melbourne a few years ago, a dangerous epidemic of typhoid fever was traced to a dairy hand who had recovered from a mild attack of typhoid many years previously.

Even if the hands are carefully washed after the toilet, the common house fly, an excellent carrier of disease, is hovering around the old-fashioned pan or the badly constructed latrine.

Dirty Skin

If anyone thinks his hands are clean, let him take a tube of sterile culture media such as blood agar, place his finger on this media for a moment, seal the tube immediately and place it in an incubator over night. The next day he will find a prosperous growth of bacteria as a film on the agar. Unless we undergo a thorough surgical preparation of our skin and immediately cover it with some sterile material sufficient to exclude the outside air, we will inevitably have the same experience. These bacteria are sitting perma-

nently on our skin. Break the skin and they get on with their dirty work.

Usually our protective mechanism is adequate to counterattack locally and successfully, and the break heals with no more sign of the engagement than a slight scar. Should we happen to be carrying around more powerful bacteria, or should for some reason our protective mechanism be sluggish, the skirmish develops into a "sore"—a "desert sore," a "Syrian sore," or a "jungle sore"—depending on where we happen to be, or into something far more dangerous—blood poisoning or tetanus. The tetanus bacterium is a natural content of horse excreta, and, in European countries where the soil is heavily manured, any wound is readily infected with this organism.

Insects and Animals

Diseases carried by insects or animals are produced by organisms which require for maturity the passage through an intermediate host. Malaria, yellow fever, or dengue require a mosquito. Typhus requires a louse. One person cannot infect another with malaria, unless a mosquito draws the blood from the patient when the disease is in a certain stage. Within the body of the mosquito, certain phases of development of the organisms proceed until a stage is reached when, if this is injected by the mosquito into another person, the disease is transmitted. In a similar manner, a person cannot directly infect another person with typhus, yellow fever, or dengue. The hydatid organism requires the body of a dog or other domestic animal as an intermediary host before it can menace another human being.

Fortunately, the physical characteristics and habits of these intermediary hosts are known. Only a certain type of mosquito—the *Anopholes*—can transmit malaria. Another type—the *Stegomyia*—is responsible for yellow fever; the *Culex* for dengue. That the female of the species is more

deadly than the male is true also of mosquitos—the gentlemen live on vegetables, the ladies alone seek blood. There are hundreds of types of mosquitos, each identifiable by their minute distinguishing features and habits.

Rigors of the Campaign

In the past, inadequacy of rations played a prominent part in diseases caused by the rigors of campaigns. Scurvy, beriberi, and other deficiency diseases due to lack of vitamins were the problem. With the introduction of a Catering Corps, none of these deficiency diseases should now occur.

Owing to the extensive and startling advertisements for certain proprietary preparations, people have become extravagantly vitamin conscious. The damage was done years ago when a firm produced the first patent breakfast food. In order to compete with its cheap, sensible, and popular rival, the staple family dish of the age, a whispering war was waged and around the world went the slogan "Porridge heats the blood and gives you pimples," and up went the dividends.

In spite of the increasing refinement of our foods, a simple, mixed, daily diet as is available to everyone and not unduly expensive contains more than adequate vitamins. However, many people still insist on spending considerable sums of money, time, and mental anxiety in the needless supplementing of this adequate diet.

Inadequacy of shelter and protection

against the elements were other disabilities of the rigors of war in the past, but with the developments of the Quartermaster and Ordnance, these have been mastered.

With the disappearance of these problems of the past, a new group of disabilities is assuming increasing and alarming importance in the Services—the war neurosis.

It was reported that after the War, 52 percent of the hospital beds allocated to service personnel in one country were occupied by these cases. Such is the increasing shelter and security provided in our daily life that many of the difficulties and dangers of other days have largely disappeared. Less effort and less fortitude are now required; robustness is not in demand and we have become soft.

Our softened fiber is generally sufficient for our streamlined existence in normal times. As a result, when conflict and difficulties come—as come they must—we have had no training, and consciously or unconsciously, we seek sanctuary in some subterfuge, which may assume some simple or bizarre form.

These people should not necessarily be considered malingerers. The cause is real and often the effect is real to the victim, however fantastic the ache or pain, the limp, or the loss of power may be. These conditions are highly dangerous, not so much to the person affected but to others in the vicinity, and if not recognized immediately and treated adequately may spread rapidly.

When people are regimented, misinformed or completely uneducated, their judgment can be so influenced that a slight misunderstanding or miscalculation can be magnified sufficiently to inflame their passions. War then becomes the inevitable result.

Lieutenant General Albert C. Wedemeyer

The German Plans for Attacking Switzerland

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FROM the reports of the German General Staff, 1939-1945, it is evident that Switzerland passed through several dangerous periods during World War II. One of the most critical of these periods was in the spring of 1943, when German reverses in North Africa led to the evacuation of that theater of operations and north-south communications became vital to the Germans.

The chief concern of the German General Staff at that time was for units in Italy, since the German intelligence service already had evidence that Italy might pull out of the War. Hence, the possibility of Operation *Switzerland* was earnestly considered. The report of the Chief of the General Staff for that period indicates the importance of the north-south communications routes through the St. Gotthard and the Simplon Tunnels, as well as the desirability of bringing the Alps-Jura Massif into the inner defense of "Fortress Europe."

On 20 March 1943, Swiss intelligence sources discovered a "Kommando Schweiz," under the command of Colonel General Dietl, was standing by in the Munich area, and that paratroop units were ready to force their way into the Swiss Redoubt. German SS groups were in favor of making the attack, but German economic experts, the *Wehrmacht* generals, and the Security Service were opposed to it. On 27 March 1943, it was learned that the plan had been abandoned.

The information possessed by the Swiss Intelligence Service was confirmed at the end of the War. That a German plan of attack on Switzerland existed is now revealed, among other sources, in General B. von Lossberg's book, *In the Staff of the Wehrmacht Command*. Von Lossberg en-

tered the Operations Section of the *Wehrmacht* Command Staff under Colonel General Jodl on 1 April 1939, and remained in that important post until the end of the War. In his book, General von Lossberg devotes a chapter to the operational plans against Switzerland. The following is quoted from this chapter:

"During the first part of the War, a turning of the Maginot Line through Switzerland was not seriously considered. Only small operational significance was attached to the Swiss area, in comparison with Holland and Belgium. The mountainous character of the country, moreover, rendered it unfit for the assembly and use of attacking forces against the southern French flank. Troop movements in the vicinity of the Swiss frontier before the western offensive began served only to deceive the French General Staff. Switzerland did not assume any greater importance until Italy had entered the War. Communications between the Axis Powers would have been considerably better if the direct routes through Switzerland had been available for military movements and the transportation of supplies. Hitler was irritated, also, when fine Swiss mechanical products were sent to England instead of to Germany. The fact that Switzerland was the focal center of international espionage was also of great importance to Germany.

"It was under these circumstances, after the victory in the West (though the precise date has escaped my memory), that Jodl ordered a small, independent staff group to determine how, if necessary, an entry could be made into Switzerland. There was no doubt but that this action resulted from one of Hitler's orders. We then set ourselves to the task of hurriedly working out the problem for Jodl.

"This study was based on the geographical fact that only a small portion of Switzerland, the so-called *Mittelland* lying between the Jura and the Alps is to any degree accessible from the military point of view. In addition, the frontier cities of Basel and Geneva, and all the other large localities, are situated there. The watch, machine, and textile industries are also located in this region, as well as the extensive aluminum industry. The most important communication routes lead from the Rhine and Rhone Valleys into the *Mittelland* and then over the Alpine passes into Italy. These routes are extremely vulnerable, due to numerous bridges and long tunnels. Many serious demolitions might be expected in any invasion.

"In the Swiss national defense, we counted on some 50,000 militiamen being under arms, besides a few reserve classes. The organization of the Army corresponded essentially to the natural defense missions; its armament was regarded as modern. The few fortifications were situated at the narrow passes. In view of the troops' familiarity with the mountains and their love of freedom, stubborn resistance locally and probably subsequent guerrilla warfare were expected.

"The rough draft of the operation was shaped in conformity with routes and terrain. Light motorized forces could push across the Rhine, southwest of the Bodensee, and mountain troops would attack on both sides of Basel toward the south. Smaller forces would possibly move out of the Rhone Valley and attack the area north of Lake Geneva. Following such a plan, the seizure of the *Mittelland* could offer no great difficulties. But of what use would the *Mittelland* be if the important communications routes to Italy were damaged by extensive demolitions? No participation of Italian troops was considered.

"The study was turned over to Jodl, and it disappeared—probably after being shown to Hitler—in Jodl's desk. In any

event, the Swiss problem never became significant. It was quickly forced into the background by the eastern (Russian) problem."

General Böhme's Plan

It is now known that the SS did not give up the plan for an attack on Switzerland when the *Wehrmacht* High Command decided against it. The group around Himmler continued to hope for an opportunity to pay Switzerland back for its anti-Nazi attitude. Colonel Böhme, former chief of the Austrian Intelligence Service, who became a general and the commander of a mountain corps in the German Army, was given the task of preparing an operational plan against Switzerland. Because of his activities with the Austrian Intelligence Service, Böhme was fairly well acquainted with conditions in Switzerland. Late in 1943, he worked out a thorough-going "memoir relative to the defense situation of Switzerland from the special viewpoint of German armed intervention." The remainder of this discussion is based on General Böhme's study.

After Austria was annexed by Germany, the Swiss frontier opposite Germany was considerably lengthened. Switzerland reacted very quickly to this change in her situation by taking defense measures along the Liechtenstein and Vorarberg frontiers.

Due to the tension in 1938-1939, great attention was given to military matters in Switzerland. Yet Switzerland hoped that in the event of a conflict between France and Germany, she might again remain neutral as she did in 1914-1918.

In Swiss defense circles, there was sufficient pro-German sentiment to guarantee neutrality, even in the face of French overtures. This situation provided grounds for a non-hostile attitude toward the German Army.

Therefore, at the beginning of the War in 1939, the Germans were able to keep only small forces on the upper Rhine between

Lörrach and Karlsruhe, and to disregard any concentration of reserves in Baden to repulse French forces which might make an eventual march through northwest Switzerland. As is known, trade between Switzerland and Germany continued.

The German break-through in May 1940 through Holland, Belgium, and Luxemburg aroused fears in Switzerland that the Germans planned a similar attack through Switzerland to outflank the French Rhine front. German troop movements justified this view, which was what the Germans desired in order to influence the French to increase the security of their eastern frontier. Another complete mobilization, similar to that of 1939, was carried out in Switzerland. This Swiss mobilization was considerably more efficient than that of the autumn of 1939.

During the campaign in the west, French forces, some of them of considerable strength, went over to Swiss territory. They were disarmed and interned by the Swiss.

The political-military situation resulting from Italy becoming a German ally, and Germany's victory in the west, had a direct and immediate effect on Switzerland.

Deeply impressed by the efficiency of the German Army, the Swiss attempted to adapt its Army to the new conditions. In carrying out effective military plans, Switzerland was faced with two difficulties:

1. The tempo of Swiss military preparations could not be so abrupt that they would alarm Germany.
2. The Swiss requirements for matériel were such that it could be brought into the country only with German consent.

Swiss Strategy

As a strategic solution, the idea of the Swiss "National Redoubt" was developed.

Although it would have been expected that the new political-military situation in Europe would lead to a complete change in

Swiss policies, reports showed only too plainly that a certain stiffening of attitude had occurred in domestic policy. The visible result was the Redoubt. The Swiss considered it better to fight than to be dominated by Germany in the new Europe.

Germany's attack on Russia had little effect on public sentiment in Switzerland, in spite of the fact that Switzerland did not maintain diplomatic relations with the Soviet Union. Switzerland made no direct contribution to the campaign, with the exception of a Red Cross mission. A movement to recruit volunteers to fight for Germany achieved little success.

The political-military situation in 1941 forced Switzerland to recognize that its continuation as a state depended on the desires of Germany. The occupation of Vichy France in 1942 also showed that Switzerland was under German pressure from all sides.

It became more and more apparent, however, that Switzerland was attempting to reduce the grip of German influence. Food-stuffs and transportation were shifted to home production as far as possible.

After the landing of the Allies in North Africa and the German reverses in Russia, a change of attitude occurred in Switzerland, despite the fact that there still was German influence in official circles.

On the other hand, it must be emphasized that the purely commercial relationships between Switzerland and Germany continued undisturbed. Also, diplomatic relationships were satisfactory.

After the fighting in Sicily and the capitulation of Italy, the plans of the Allies were clear. After September 1943, however, the German Army had complete control of the northern Italian area, and Switzerland was thus surrounded on all sides by German influence. This was an extremely difficult situation from the Swiss standpoint, but it would have been erroneous if the Germans had assumed that Switzerland had any intention of revising

her military policy in Germany's favor at that time.

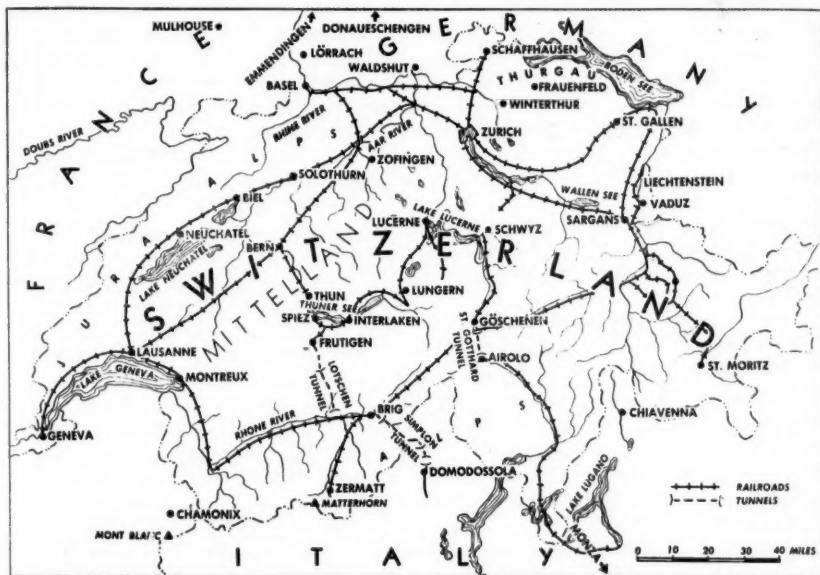
As a result of War developments, the importance of the Swiss industrial area increased considerably from the standpoint of the German military effort. As the importance of the northern Italian armament industry declined, the transportation of coal to Italy was no longer as important as in the past; therefore, the importance of the Swiss rail lines was somewhat reduced.

Switzerland's position was well known to the Allies. There was no lack of effort

a year if industrial production had been strongly curtailed, all resources had been used, and the slaughtering of cattle had been allowed. During this year, in which Switzerland would have been forced to live without imports, a decision could have been reached in the War by an Allied landing in Western Europe or the Balkans.

If Switzerland had ceased co-operating with Germany, how could she have been quickly subjugated in a military campaign?

The answer depends mainly on the estimate of respective strengths, and in this estimate the complete encirclement of



to get Switzerland to break the agreements she had entered into with Germany. Although a part of her population would have approved this step, Switzerland did not make an industrial break with Germany.

Purely from the standpoint of Swiss economy, the break could have been considered. Switzerland's supplies would have lasted, with extreme economy, for at least

Switzerland at that time was a factor in favor of Germany.

Swiss Strength

The Swiss Army possesses a great tradition. Its defense system raises it above the level of many others. Intensive employment is made of the nation's natural defenses. Though the strength of the Army was 470,000 men in 1939 (inclusive of all

auxiliary services), it rose to around 550,000 by the end of 1943.

Also the number of large units increased so that there were 4 corps (altogether 10 to 12 divisions), 3 or 4 light brigades, 4 mountain brigades, frontier guards, and fortress troops.

These forces seemed considerable, but they were not comparable in fighting power to the German forces.

Swiss equipment marked the Army as definitely an infantry force. The national armament industry was able to manufacture hand weapons, machine guns of up to 34-mm, cannon up to 105-mm, 120-mm ammunition, and motor vehicles. Switzerland had only a small number of airplanes—about 250—mostly of German and French make. She had no bombers.

The fortified zones in the country's interior had been increased, and the frontier fortifications started to a considerable degree.

In addition to the firearms in the possession of all men, the weapons stored in the depots were sufficient to equip additional units.

Many in Germany claimed that the Swiss Army was not very strong. As grounds for their contentions, they claimed that:

1. Neither the Swiss High Command nor the forces of Switzerland had had any experience in modern warfare. Maneuver reports showed the clumsiness of the command and the unmilitary conduct of the men due to lack of training.

2. Armament was inadequate in many respects. Antitank defense was not what it should have been, due to the small caliber and insufficient number of weapons. The anti-aircraft defense was poor, due to the same reasons.

3. Since there was practically no air force, the Swiss Army would be without even rudimentary support, observation, or reconnaissance. In addition, the airfields would not permit the operation of any large Allied formations.

As one large territorial division along the Swiss border area would have to be a battlefield as well as a supply and industrial base, it thus presented an inadequate defense in depth. As a consequence, every battle would be followed by devastating results. Serious repercussions on the fighting Swiss soldier would be inevitable.

These arguments had a certain degree of truth, but it was wrong to underrate the worth of the Swiss Army solely on this basis.

The Swiss soldier's will to fight is very strong and must be compared to that of the Finns. A people which produce good athletes has always produced good soldiers. The love of the Swiss for their native land is of the highest order, and their training in marksmanship, in spite of the militia system, is better, for example, than in the former Austrian National Army with its 18 months of service.

Swiss weaknesses, from the technical and training standpoint, as well as a certain degree of inferiority on the part of the lower grades of commanders, would be neutralized to a certain extent by the frontier fortifications. Since 1938, the Swiss had been improving their fortified zones. Even though the Germans had developed effective attack methods which had overcome heavier obstacles than the Swiss frontier fortifications, these fortifications still represented an obstacle. In addition, on the basis of German information, Switzerland would not fail to impede any advance by means of demolitions in her frontier areas. But in spite of all planning with respect to the frontier fortifications, it must not be forgotten that a great change had occurred in views relative to the Swiss national defense as a whole.

Prior to 1939, the Swiss would have made their main defense along their frontiers. In 1943, however, the idea of the National Redoubt was in the foreground.

This Redoubt—essentially, the Rhone

Valley from St. Maurice upward; the upper Rhine; and the railway lines and highways of the St. Gotthard, Lotschen, Simplon, and Albula Passes—was to be occupied by those field forces which were still able to fight. The Redoubt contained important supplies, and the routes leading to it were guarded by fortifications which were continually manned.

If an operation were to be conducted against Switzerland by the Germans, with the objective of outflanking the Rhine front by a drive over the Jura Mountains, the pushing back of the Swiss troops into the Redoubt would not have been absolutely necessary. But this was not the case. The objective of the German attack was, rather, to seize possession of the important north-south communications. Only the unqualified possession of these communications, or at least the two western ones, together with electric power plants, would have constituted a definite military victory over Switzerland.

There was also another and no less important matter to take into consideration. Only a half-way intact Swiss industry, a population which was not only able but willing to work, and undemolished power plants and railways would have constituted a prize sufficient to justify armed intervention in Switzerland. In the face of the strained condition of German supplies, it would not have been militarily defensible to conduct operations which would result in a devastated country.

Hence, the following situation existed: The Swiss had at their disposal an army which was definitely a factor to be considered, even from the standpoint of numerical strength. Overcoming the stubbornly fighting forces in the high Alpine Redoubt would be a task that would be hard for Germany to accomplish.

Proposed Operation

In accordance with the foregoing facts, the German operational objectives were as follows:

1. Destruction of the Swiss armed forces and the prevention of their direct support by the Allies.

2. Rapid seizure of the most important communications routes and restoration of the Swiss armament industry.

The attack would be greatly aided by the fact that all sectors of the Swiss frontier could be approached and forces assembled without any fear of Swiss counteraction on German soil.

The plan would have to be carried out in two operations which, initially, would be conducted independently of each other.

Operation I.—The seizure of the central mountain zone, with the main effort in the north. Quickest possible seizure of the more usable Swiss airfields, in order to render impossible any eventual support by Anglo-American air-landed forces. Capture of the main body of the Swiss Army.

Operation II.—Penetration into the Redoubt by using air-landed forces, and the seizure of all entrances from the south and east by means of mountain troops; later, seizure of the northwest approaches by ground forces.

The successful development of the two operations depended on the air-transported or airborne forces during the first 72 hours. Taking advantage of the surprise that might be attained, these forces were to block all passages leading from the *Mittel-land* into the Redoubt, in order to disrupt the plans of the Swiss High Command.

The mission of the German Air Force was to provide a defense against Allied bombing attacks on German assembly positions and supply lines.

Operation I

Since Switzerland attached great importance to the frontier fortifications which were strongest on the Rhine and in the Schaffhausen area, these fortifications were to be immediately destroyed. This was to be done by rocket mortar units and army artillery. After successfully



The Swiss Army, although small by comparison with that of Germany in World War II, was well-trained and equipped with modern matériel. Above, anti-aircraft guns being used in training. Below, three fighter aircraft from the small Swiss Air Force flying a patrol mission over the towering Alps Mountains.





For centuries, Switzerland relied on strong frontier fortifications for defense, but modern warfare forced the nation to change. The inner Alps were turned into a fortress, and were heavily stocked with the food and munitions needed to withstand a long siege. Above, a patrol in the Redoubt region. Below, dogs being trained to carry ammunition.



crossing the Rhine, these forces would be immediately available for other operations.

The natural bridgehead at Schaffhausen was to be seized first. The break-through of small zones, and the build-up of useful bridgeheads, would go hand in hand with the capture of the Rhine bridges at Basel, Waldshut, and other places. Bridging material was to be brought up. Engineer landing boats and emergency craft could be used to cross the Boden See and to make landings on the shore of Thurgau. The first attack wave was to consist of strong combat groups from four light infantry divisions.

The widening of the bridgeheads was to be achieved on about the second day of the attack, in order that three *panzer* divisions would be able to attack through the infantry units. Previously employed light infantry divisions were to regroup for new employment.

An armored division was to push out in the general direction of Solothurn.

One *panzer* division from Waldshut was to advance into the Aar Valley; from there it was to fan out in the direction of Zofingen and Zurich.

One *panzer* division was to attack east of Schaffhausen, through Winterthur.

After reaching the line: Biel—Bern—Lucerne—Zurich, the mass of the armored corps would be ready for other use on about the fifth day of the attack.

The four light infantry divisions following the armored units would continue the drive in the direction followed by the armored forces in their attack. The assignment of motor transport regiments to these light infantry divisions would be advisable in order that they might carry out long marches with the utmost speed. All Swiss formations still in existence were to be quickly crushed in order to prevent the subsequent formation of partisan forces.

Small German units which would conceal their strength with the help of surprise

fire were to continue to hold the passes into France over the Jura Mountains. The fortifications there, as far as they still were held after the collapse of the Rhine front, were to be captured by the light infantry divisions, using small units.

The light infantry divisions were to seize the entrances to the Redoubt in order to relieve the *Luftwaffe* forces fighting there.

Operation II

Seizure of Geneva and the landing of a division in the neighborhood of Lausanne was to occur on the first day of the attack. A column was to advance toward Montreux to the entrance of the Redoubt, while another column east of Neuenburger Lake would attempt to join the light infantry divisions attacking from the north.

Air force activity in this operational area would be limited, at first, to:

1. Destruction of Swiss aircraft and the gaining of air superiority.
2. Dive bombing attacks on a few of the larger fortified works in the frontier zone; attacks on marching columns and troop concentrations.
3. Providing fighter protection for the marching German columns and assembly positions; antiaircraft protection for the Rhine bridges.

4. Seizure of the Swiss airfields and emergency landing fields, and their restoration for German use.

The bombing of anything other than troops was unnecessary.

Operation II against the Redoubt was to be launched simultaneously with, but independently of, Operation I in the north.

On the morning of the first day of the attack, the *Luftwaffe* was to drop units of one paratroop division in Brig (Lotschen-Simplon), Göschenen-Airolo (St. Gotthard), Lucerne-Schwyz, Spiez-Thuner See, Frutigen (Lotschen), Thun (Simmatalbahn), and on the airfields of the Redoubt.

Simultaneously with the landing or dropping of forces, an army of mountain forces, broken down into numerous combat groups with strong reserves, was to attack along the roads through the high Alpine frontier of Southern Switzerland. It was necessary to attack there as quickly as possible and in several places. In case progress was favorable, the reserves were to be committed regardless of the situation of an adjoining unit. Under certain circumstances, the withdrawal of forces which had not succeeded in effecting any advance was conceivable, since a Swiss counterattack, in view of the Swiss manner of fighting, was not to be expected.

The assignment of a few good mountain, reconnaissance, and fighter squadrons was necessary. An attack was to be conducted, not only from the Vaduz-Sargans region in the direction of Wallen See, beginning on the first day of fighting, but also up the Rhine. The *Luftwaffe* operating from Northern Italy was to supply the air-landed forces and provide protection for the valley barriers.

General Remarks

Artillery fire on villages, factories, and power plants was to be avoided. During the operations, collecting places for captured matériel and equipment (thorough disarmament was deemed necessary) and prison camps (only officers were to be deported) were to be organized. The technical supply installations and electric power plants were to be taken over by the German *Todt* Organization. German railway experts were to assume control over the Swiss railway network, though direct intervention was to be avoided. Industrial experts were to be given the mission of protecting the most important production installations. Swiss police were to continue functioning.

Troop Requirements

For conducting Operations I and II, the

following German forces were considered to be necessary: to be assembled along the north frontier; 4 light infantry divisions organized into 2 corps, each with 1 truck transport regiment attached; and 3 armored divisions under a corps staff. The two light infantry corps and the armored corps were to constitute the Northern Army, reinforced by the following special forces: 2 artillery brigades, each artillery brigade being assigned to a light infantry corps; 1 rocket projector brigade; a high engineer officer with 6 assault boat companies; 6 bridge building battalions; and 2 engineer battalions of assault engineers.

In the communications zone, detrainment of these forces was to be in the Muhlhouse, Donaueschingen, and Emmendingen areas. Each light infantry division would require 40 trains, and each armored division 78 transport trains. Thus, not counting special army troops, some 400 transport trains would be required. In addition, 200 transport trains for special troops would be needed. Consequently, for the entire Northern Army, 600 transport trains, together with trains for ammunition, motor fuel, provisions, and hospital equipment, were needed. *Luftwaffe* forces required would be as follows: 1 combat group; 1 fighter or destroyer group; 1 reconnaissance group; 1 anti-aircraft artillery regiment; and 1 ground unit.

Supply dumps were to be located close to the Swiss frontier. Fifteen days' rations and ammunition (except for the special army troops) and 8 days' supply of fuel were to be provided.

Supply centers were to be close to the border. Swiss supplies to any substantial amount were not to be counted on, since Swiss army supplies were to be used in the prison camps. Any extensive interference with the Swiss civil food supply was not desired. On this account, some 30 days' rations for each light infantry

division and 10 days' ration for each armored division were to be provided. Similar figures were to be used for animal forage. The forage situation was extremely critical in Switzerland. Seizure of horses was to be contingent on the extent to which the country's agricultural status was to be preserved.

On the west (Jura) frontier, the following forces were to be employed: 1 infantry division, plus 1 artillery commander with 8 artillery battalions; and 1 signal communications regiment (motorized). Thirty transport trains were required and artillery was to be towed by motor vehicles. Ammunition supply for 15 days was to be provided.

On the southwest frontier, 1 reinforced light infantry division with 1 reconnaissance battalion (armored), and 3 assault-boat companies were to be used. Fifty transport trains were required for this force.

Also, on the southern frontier, 1 mountain brigade (at that time stationed in Chamonix), 1 mountain corps of 2 divisions in the Montblanc-Domodossola-Lake Lugano area, and 1 mountain division from Lake Lugano-Chiavenna were to be assembled. Altogether, these units would make up a mountain army to which 1 transport-truck regiment was to be assigned. Transportation requirements were some 240 trains exclusive of supplies or ammunition. Detrainment was to be made at stations close to the mountains.

One paratroop division with a transport wing, 1 fighter group, 1 pursuit group, 1 reconnaissance group, and 1 antiaircraft artillery regiment were to be supplied by the Air Force.

On the east frontier in the Rhine Valley, 1 corps with 1 mountain division advancing up the Rhine, and 1 rifle brigade (Südliechtenstein-Wallen See) would be needed. About 70 transport trains would be required for this force.

The over-all requirements for the Army—for at least 15 days' employment—were as follows: 4 light infantry divisions, 1 reinforced light infantry division, 1 light infantry brigade, 1 infantry division, 4 mountain divisions, and 1 mountain brigade. The *Luftwaffe* would require 1 paratroop division. One army group staff, 2 army staffs, and 4 corps staffs would be needed. For at least 5 days' employment, 3 armored divisions and one armored corps staff would be required. For at least 3 days' employment 2 artillery brigades, 1 rocket-projector brigade, and engineer troops must be provided. For the assembly of these forces, therefore, at least 850 transport trains—not counting supply trains—would be necessary.

In view of the situation on the other German fronts at that time, and the extremely difficult transportation conditions, this assembly and detrainment would have required at least 4 weeks. The mountain division had to be brought from the Norwegian area, which would require at least 8 weeks, not counting time for necessary refresher training.

The concentration of 3 armored divisions and almost 12 other divisions and special forces seemed sufficient to crush any Swiss resistance. The three armored divisions would soon be free for other uses. The use of mountain divisions was absolutely necessary.

The infantry divisions also had special equipment which permitted them to be used in mountains of medium altitude.

In order to simplify supply, command, and transportation, the number of battalions in the light infantry and mountain infantry regiments could be reduced to two.

German losses as high as 20 percent were to be expected.

Operations were to be conducted under an army group command stationed at Feldkirch.

The estimate of forces required and the operational plans were based on conditions found during the summer months, preferably the month of August.

Conclusions

The work of the German Army Staff and of the SS on an attack of Switzerland stopped in the planning stage. That such plans existed is proof of the importance attached to Switzerland by the Germans from the military and economic points of view.

From the two reports outlined here, many interesting facts may be learned, even though we are quite aware that we are not dealing with perfected operational plans, and that there are many other possibilities in planning an attack on Switzerland. It is, however, very instructive to read the opinion of the Swiss Army entertained by the Germans. Care must be taken, however, not to draw general conclusions from the two studies. It seems permissible, however, to call attention to the following points:

1. In the military and economic estimate of Switzerland, the significance of the *Mittelland* is outstanding. The estimate of the operational possibilities of an attack in this area is very favorable in view of the numerous communications. Swiss industry, in the main, is located in the *Mittelland*. This estimate should remain entirely valid for the future.

2. The importance attached to the north-south routes of communication is very striking. We find in it confirmation of the Swiss concept of the political-military significance of their country as the "turntable" of Europe. This significance may diminish in the age of long-range weapons and large air transports. As an intermediary, however, between

Western Germany and Eastern France on the one hand, and Northern Italy on the other, Switzerland will always play an important political-military and strategic role in Central Europe.

3. The German estimate in both plans of the Swiss spirit of resistance is of special interest. The determined Swiss will to resist was evaluated as a decisive factor. This factor will certainly also be considered vitally important in any future plan of attack on Switzerland. It is, however, of importance to note that not only Swiss defense-mindedness but also spiritual defense-readiness are taken into consideration. Other nations will ascribe still greater weight to Swiss matériel preparedness in weighing their chances of success in any attack. As regards the latter, the mistaken idea still largely prevails that Switzerland shall again have months or years in which to bring her matériel preparedness up to the necessary level. The estimate made of Swiss anti-tank defenses and air forces in the German plan should be a warning.

In 1943, the German attack plans remained unused, mainly because the Swiss Army represented considerable power of resistance. Too many German divisions would have been required to crush that resistance. This same factor must always be present in the Swiss national defenses of the future. Every foreign general staff must be forced to count on using so many divisions to conquer Switzerland that Operation *Switzerland* would be considered too costly.

In order that the Swiss Army may again attain this deterrent value, considerably more must be done to increase its military fitness than is being done at present.

British Generalship

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Digested by the MILITARY REVIEW from an article by Brigadier C. N. Barclay in "The Army Quarterly" (Great Britain) January 1950.

PRIOR to 1914, the British Army had not engaged in large-scale land operations for several generations. The South African wars were hardly major operations in the modern sense. The generals and staffs were unaccustomed to handling large bodies of troops and had had no training in war on a continental scale. Very few officers had given the matter serious thought.

Our enemies, on the other hand, had fairly recent experience—the Franco-Prussian War of 1870—and had for years adopted universal service and studied the problems of the nation in arms.

Under these conditions, British generals were hardly likely to show up to advantage.

By 1939, we not only had the experience of the previous War, but our whole outlook toward war had changed. We had even adopted conscription in peace, and our whole military organization was framed for expansion and for conducting total war. In many ways, we had the advantage over our chief enemy, Germany, whose military forces had been very strictly limited in strength for most of the period between the Wars.

The conclusion from these facts is that in 1914, our generals were faced with problems which were beyond their experience and training. In 1939, they were to fight the kind of war they had expected and for which they had prepared.

Political Leadership

There can be little doubt that the quality of the political leadership—or statesmanship—of a nation at war is reflected in the activities of its armed forces.

In the early years of the 1914-1918 War, the country was led by politicians who, although they may have rendered fine service in connection with social matters in peace, were quite unfitted to conduct a major war. Later, under the leadership of Lloyd George, matters improved, but even at its best, our political setup in those years was amateurish.

In the second struggle, except for the first few months, our affairs were in the hands of a master of the higher art of war. In all-round military knowledge and experience, in drive and determination and the personality and character which win wars, Mr. Winston Churchill has no equal in history.

As a generalization, it may be said that in World War I, there was no place for the service leader with a bold plan. The politicians favored the timid and "safety first" generals. In World War II, the attitude was reversed. Inactive or hesitant leaders found no favor with the Prime Minister of those days. But anybody prepared to take reasonable risks, or with a bold plan or suggestion, was assured of a hearing.

This difference in the mental outlook of the head of the Government and his leading ministers had a marked effect on the commanders in the field. Those of 1914-1918 felt that at all costs, they must avoid defeat. Those of 1939-1945 knew that they were expected to gain victories, and to this end they were encouraged to take reasonable risks and could expect every assistance which the Government had the power to provide.

The former brought out the worst in a general; the latter the best. This factor,

probably more than any other, was responsible for the apparent difference in the quality of British generalship in the two Wars.

Training

Prior to 1914, there was an impression that a general automatically knew all there was to know, and that it was derogatory to the prestige of a senior officer to undergo serious training for war. The high commander was a dignified figure whose main duty was to criticize others, and pass on his profound knowledge to his subordinates.

World War I altered this outlook, and between the Wars, the training of higher commanders became a reality. Brigade and divisional commanders, and others, were relieved of much of their previous administrative duties and, in consequence, devoted a high proportion of their time preparing for the jobs they were likely to hold in war.

Staff Duties

There is little doubt that the system of staff training immediately prior to and during World War II was superior to that previously in vogue.

This was reflected in the improvement in relationship between the troops and the staff. It is not an exaggeration to say that in 1914-1918, the troops in some formations hated the staff. In the 1939-1945 War, it would be true to say that, in the vast majority of cases, the troops regarded the staff as their friends and the two got on admirably together.

Moreover, certain modern innovations in staff methods have been of great benefit. Perhaps the most important of these is the system of highly organized planning. In the recent War, long before any important operation was carried out—often before the commander, staffs, and troops had been designated—a planning staff of comparatively junior officers was formed to study every aspect of the operation. This saved the eventual commander and staff much

time and worry, and supplied them with a fund of considered opinion and information. Naturally, the system produced difficulties, as to some extent it meant that the commander had to carry out a plan devised by others. But on the whole it was a great success.

Quality of Our Enemies

In the early months of World War II, much was heard of the alleged, almost miraculous, efficiency of the German Armies which overran Poland, Belgium, Holland, and France. The *panzer* divisions, supported by the German Air Force, were thought by some to be unbeatable. Similarly with the early Japanese victories in the Far East, the Japanese soldier was hailed as a superman and his arms and equipment were considered of almost perfect design and quality.

In fact, there is little doubt that the German Army of 1914-1918 basically was considerably superior to that of 1939-1945.

It had had years of uninterrupted training, and its organization had been tested from every angle on innumerable staff exercises and maneuvers. The comparatively simple weapons and equipment of those days were of proved design and workmanship, and in lavish supply. There were large reserves of trained men, and the commanders and staffs were of superlative quality.

The German Army of 1939 had been hastily built up. The internal combustion engine on land and in the air gave it an initial superiority over enemies whose intentions were not aggressive, and who were only partially armed. It had not, however, the trained reserves of men or reserve stocks of war material, and in consequence, it lacked staying power. Although the individual German soldier fought bravely to the end, the German Armies lost cohesion at a much earlier stage than in the previous War.

The Italians showed even less military

prowess in World War II than they had in World War I.

It was not long before the Japanese reputation was to be disproved. The Japanese remained fanatically brave and patriotic, but they were no match in skill, or in the production of modern military equipment, for their American, British, and Indian opponents. In the end, they showed lack of determination and staying power by surrendering unconditionally before a single Allied soldier had set foot on their homeland. Their short cut to civilization had only produced superficial results. Under the surface, they remained a semi-civilized and somewhat backward race.

Similarly, the German High Command of 1914-1918 was probably superior to that of 1939-1945. The German generals were of high quality in both Wars. But those in World War I were almost certainly hampered less by the Kaiser and the German princelings, than their successors were by Hitler and his associates. The Italian General Staff in World War II displayed a degree of incompetence unknown among our enemies a quarter of a century before. The Japanese war lords showed only superficial capacity.

It is not untrue to say, therefore, that our opponents in World War II were inferior to those of World War I, especially in staying power.

Modern Inventions

The age of the mass production of the internal combustion engine, and the vehicles which it was to propel, commenced during the closing years of World War I. The airplane, tank, and modern truck were just beginning to make their existence the predominant factor on the battlefield.

Between the Wars, the motor-propelled land vehicle and the airplane made rapid strides, and by 1939 they had altered the character of land warfare. In 1914-1918, the defense predominated over the offense, although by 1918 the tide was beginning

to turn. In World War II, the offensive always predominated. The efficient cross-country armored vehicle and the fleets of aircraft had restored the fluidity of war on land.

This technical progress was largely outside the control of the generals. Science and civil industry placed weapons and equipment in their hands in 1939-1945, which were denied to their predecessors of 1914-1918. It may be said that this was true for both sides and that it, therefore, produced no advantage to British commanders. This may be so, but it did create the opportunity for skill and enterprise which was denied to the generals of World War I. Moreover, in many items, mass production eventually favored Britain and her Allies, as their opponents could never match the stupendous production of the workshops of the United States.

Summary

In the above paragraphs, the differences in conditions in the two World Wars have been examined.

There are, of course, a number of factors which may be said to confer an advantage on the British generals of the later decade, but which have not been considered because this advantage is cancelled by a similar advantage conferred on the enemy high command. An example of this is the revolutionary improvement in signal communications between the Wars. At first sight, this might appear to be advantageous to the generals of 1939-1945, when comparing them with those of 1914-1918. Further reflection shows that on balance, little or no advantage accrued, as the German, Italian, and Japanese generals were almost equally well supplied with modern signal equipment.

Other factors which, at first, appear to "cancel out," are found to favor one side or the other on closer examination. As explained earlier, the mass production of mechanical vehicles was a factor which

ultimately favored the Allies, owing to the unrivaled facilities of the United States in this field.

It must, however, be borne in mind that even if all modern conditions and recent innovations "cancelled out" owing to giving equal advantages to both sides, they do confer advantages on the good general which his unskilled opponent will be unable to realize. Give a good general plenty of tanks, guns, and the support of large numbers of aircraft, and he will make good use of them. In the hands of a bad general, they will bring muddle and confusion and probably a lost campaign or battle.

Certain factors affecting the issue were beyond the control of the generals, or very nearly so. The improvement in aircraft between the Wars and the high capacity of our Prime Minister of World War II are examples. Others were of the generals' own making. A field in which the generals of World War I are open to criticism is that of training. It cannot be said that they made any effective attempts to make the soldier's training interesting or progressive. It was mostly dull and often of little military value. The high commanders of World War II greatly improved on this, and as generals, this is to their credit. Similarly the commanders of 1939-1945 initiated and perfected the highly organized system of "planning" which became a feature of all major operations. The fact that this was not done by the generals of 1914-1918 but was done by those of 1939-1945 is a mark against the former and in favor of the latter.

Another important consideration is the moral factor. In the 1914-1918 War, our enemies behaved with reasonable humanity. Although there were some grounds for complaint, our forces were not put to any serious disadvantage on this score.

In the 1939-1945 struggle, our opponents behaved in some cases, with almost unbelievable dishonesty and brutality. Mass executions, concentration camps, the trai-

torous attack on Holland and Belgium, and at Pearl Harbor, and many others, are examples. Our enemies sank to policies and acts which were quite out of the question for our own troops. Obviously, this operated to the material disadvantage of our higher command.

Conclusion

It is the author's opinion, after taking into account the differences in conditions and viewing the problem from many angles, that British generalship in World War II was considerably superior to that in World War I.

He [the author], realizes that many will disagree with this view. He advances it with feelings of greatest respect and admiration for those truly great generals of World War I—headed by Lord Haig—who for uprightness of character and staunchness in adversity remained unrivaled.

His opinion is based on the following questions and answers:

1. Were avoidable mistakes frequent in World War I? In other words, were there many occasions when the generals could reasonably have been expected to do better or adopt better methods?

Yes; the general policy of attrition and failure to produce novel or surprise methods; faulty training methods; failure to learn from experience, such as the series of costly offensives on the Western Front all ending in failure; faulty planning, as at the Dardanelles; faulty strategy, such as the premature advance on Baghdad; and the faulty handling of reserves at Loos in 1915 are examples.

2. Did the generals of World War II show a high standard of professional skill?

Yes; our early withdrawals were mostly inevitable and were, on the whole, conducted with skill. Where strategic errors occurred, they were usually political decisions such as the campaign in Norway and Greece, and the attempt to occupy Dakar. One phase of the North African

campaign and the operations in Malaya—culminating in the surrender of Singapore—are, by common consent, open to severe criticism. On the whole, however, serious military blunders were surprisingly few. There were, on the other hand, many examples of brilliant generalship: General O'Connor's early campaign in North Africa; Alamein, Sicily, and Italy; the Normandy campaign; and the crossing of the Rhine. A detailed study of the many campaigns and battles of World War II discloses very few major mistakes and a surprising number of brilliant campaigns and engagements.

It is also the author's opinion—and here again he appreciates that many will disagree—that the superiority in generalship in World War II was mainly due to the following factors:

1. Superior political leadership.
2. Superior training methods prior to and during the War, especially in training the higher command.

During World War II, formations and units usually had much longer to train than in World War I. Before the Nor-

mandy D-day in June 1944, some units had been training for years.

3. Superior staff methods, especially in the sphere of planning.

4. Inferior opponents, especially as regards staying power.

Admittedly, these factors made the generals' tasks easier, but it must be remembered—and this is the author's main argument in support of his view—that only good generals could have taken advantage of these favorable conditions and that some of these factors (2 and 3 above, and others of less importance and not quoted) were of the generals' own making. Obviously, that is a point to their credit.

If, as the author maintains, the generals of World War II displayed a high standard of professional skill, the result of their skill was far-reaching. The Nation, indeed the whole Commonwealth, was not prepared to sacrifice its young men a second time to generalship of the 1914-1918 kind. The Country was in no mood for a war of attrition, and there can be little doubt that Army casualties on the 1916-1918 scale would have resulted in indignation, if not panic, and serious loss of national morale.

The Problem Of National Defense

Translated and digested by the MILITARY REVIEW from an article by M. Albert Devèze, Minister of National Defense, in "L'Armée-La Nation" (Belgium) February 1950.

BEFORE we take up the question of the national defense of Belgium, let us take a brief look at the general world situation.

But let us first locate the framework of our problem. In Washington, in London, and in Paris, whether with reference to the Five-Power Pact or, more broadly, to the Atlantic Pact, the Western nations which are working together in defense matters have no other purpose in view than peace and security.

Each one of them is aware of the fact that alone, it is exposed to possible aggres-

sion, and that only through the pooling of all the defense forces at the disposal of the free nations, can the danger of war be eliminated.

It is the only possible guarantee of security. As for myself, I do not believe in words, in writings, or in vague theories. I believe that aggression will not occur if the aggressor knows in advance that it will not pay and that he will be beaten.

Each nation understands, therefore, that its first duty is to develop its own defensive force to the maximum, no matter how bur-

densome and painful the accomplishment of this first duty may be.

But each nation, when it has carried its efforts as far as it can, will feel that its sacrifices are useful and, consequently justified, only if pre-established co-operation properly organized from the military and economic viewpoints exists. This will be effective, only when we see other nations giving or receiving all possible assistance, in the preparation of military means, as well as in putting them into action if the need should arise.

It is necessary, therefore, that all nations do likewise, and that they pool all means, all possibilities, and all potentialities, so as to attain the maximum capabilities to assure the security of the West.

Nevertheless, even united, these nations are aware that their collective effort would be insufficient in the absence of the generous material and financial aid offered by the United States.

I am quite aware that some criticize the control the Americans exercise with regard to the utilization of their aid. As for myself, I rejoice in it.

For example, the American matériel may possess a value to the United States of several billion francs.

I contend, therefore, that it is our duty to provide the proper storage for this matériel, to keep it in condition, and to protect it. It is equally our duty to prepare the combat units capable of putting this matériel into action in case of aggression.

The Belgian Problem

The first Belgian problem is the organization of what has been designated as the "battle corps" but which I prefer to call the "attack forces" destined for action outside our frontiers, in conjunction with the inter-allied forces with headquarters now at Fontainebleau.

To be sure, these forces comprise, as their first element, the units stationed in Germany which make up the Belgian occu-

pation forces, commanded by Lieutenant General Piron.

The present strength of these forces is sufficient for the accomplishment of the task that is incumbent upon them in time of peace. We have just obtained a status for them similar to that of the British occupation forces. To alter this situation, it would be necessary to change the tri-zone structure of Western Germany, and even change the Potsdam Pact and the Washington Agreement of 1947. We cannot demand that a Belgian zone be created, but we have a right to a sector of our own in which the Belgian Army is on an equal footing with the British Army. Our commander in chief is no longer the subordinate of the commander of the British forces, and is no longer responsible to any but the administrative authority of the High Commissioner who represents Great Britain in the Supreme Control Council.

The occupation forces are only one element of the attack forces. The latter, now, must also be placed under the orders of General Piron, so that he may have permanent control over them. They comprise army elements stationed at present in Belgian territory, and reserve elements for which permanent mobilization cadres have already been constituted. These forces would and could be called up in a very short time and would join the Army of Occupation to make up the attack force.

What is the size of this force in men and matériel?

In comparison with what it was at the beginning of 1949, it will have been doubled by February 1950, and will be tripled by February 1951.

This may be regarded as a fine effort whose realization is dependent to the appropriations I request of Parliament; dependent also to that American aid which must be hoped for, but which we must also show that we deserve.

But a matter that is little talked of but which, I dare say, is the chief ob-

ject of my concern, is the protection of Belgium itself. As regards this matter, heretofore, only cover has been mentioned. Cover, to my mind, is the attack forces operating outside our frontiers. But it is in the interior of the country that a protective army must be ready from the very first day of an attack. Things are no longer as they used to be when an army, outside the boundaries of a nation, protected it from invasion. Under the present conditions of war, on the very first day of hostilities, we shall have air attacks of great intensity, and we shall have a rain of parachute forces charged with sabotage operations. Entire air-landed divisions may drop down on us from the skies with guns and tanks, ready to fight like first-line divisions. Lastly, we shall have a fifth column which, as you must realize, will be of quite different strength and organization than the fifth columns of other wars.

That is the danger and it must be faced squarely, for as long as it exists and we are without protection against it, there will be no point in fighting on the Rhine or before the Rhine and as far as the Oder; we shall have the enemy at home. All the rear areas will be threatened, and Belgium could fall while her forces were engaged in fighting outside her frontiers.

To be sure, we have some home forces, but they are insignificant, and the country must know it.

We have a few so-called covering battalions. We also have that magnificent corps, the Gendarmerie, which we must not regard solely as the element responsible for the maintenance of internal order and peace. It is also an element which is composed of elite soldiers capable, under a well-trained command, of being our shock force.

Here is what we can now add to this. The bill which I recently introduced in the Chamber would permit the effective organization of the territorial air guard, that is, antiaircraft artillery which, distributed

over the territory, will have as its objective the prevention of aerial attacks on vital points.

With American equipment whose arrival is announced, we shall try to complete our air defense.

But all this is not sufficient. I consider it indispensable to put the entire command of the Army of the Interior in its place in order that it may learn its missions. Officers will be needed for this, and we do not have enough of them. We must have them in order that they may learn their mission; that they may learn the location of the vital spots; how they may best be defended; and in order that they may make an inventory of the means at their disposal and decide what is still necessary.

Only thus will it be known what has to be done. And what has to be done must be done without haggling and done immediately.

Lastly, it will be displeasing if I did not refer to the air force. What would an army be without aviation? What would the interior defense of our country be without powerful fighter aviation, without our jet-propelled *Meteors*?

We must also have tactical aviation to support our attack forces if they have to go into action. It must be ready.

I can say this: By February 1951, what we shall have will be approximately doubled. This will be so if the appropriations are granted, and we obtain all the means for which we have provided.

There is also the naval force, whose important mission cannot be, as too often is the case, the object of neglect. It is of prime importance that we be capable of ensuring the security of the shipping along our coast. It is of prime importance that we maintain a protected sea lane between Belgium and England; that we do not leave to others the de-mining of the mouths of the Scheldt; that we are able to escort the convoys which, perhaps, would have to unite Belgium and her colony.

At the present time, our naval force is embryonic. It has just come under the jurisdiction of the Department of National Defense. Our sailors are barely used to military activities.

At the present time, they have new fleet minesweepers at their disposal. They also have smaller minesweepers. If everything goes well, and if the program is realized, the number of vessels we have at our disposal at the present time will be multiplied by three in a year's time.

For all these reasons, I believe that the year 1950 will be a crucial one for Belgian national defense and especially the Belgian Army. Either we will witness a growth, a new youth, a new order, or we shall pass through a period of discouragement.

It is necessary, therefore, that the entire nation turn toward the Army and spare nothing in raising the Army morally and materially, causing it to be conscious of the greatness of its mission and of its being equal to the task of fulfilling its mission of public security.

There are problems of a different order, such as that of the cadres, that should be considered. I have indicated that a great many officers are required to form the Army of the Interior. There are two elements: the reserve cadre, and the active cadre.

My intentions toward the reserve are of the best, but not from the standpoint of leaving it alone. My feeling is, rather, to arouse it with a view to having a reserve cadre able to carry out all its missions; to make it a truly active and useful element in the mobilized Army, thereby providing a magnificent instrument for spreading the patriotic idea of national defense.

Then there are the active cadres, and I believe that the creation of a complementary cadre ought to be considered here.

In order to have a great many officers, we must not lower the standard of their entrance examinations. We must turn to

the young men, to the reserve officers, and give them the chance to have a part in the complementary cadre. After some time, these men will return to civilian life, if such is their desire or their interest. If, however, they become attached to military life, they may remain in the Army by passing the difficult examinations, and thus will become part of the professional cadre.

This is a big problem and I am attempting to explain it in a few words. The cadre system already or partially exists in the Air Force. We are studying how to solve it for the ground forces.

Lastly, we must consider the professional officer. The individual who takes up a civilian profession does it with a view to shaping his future, thus taking care of his own and his family's destiny. Though these considerations are likewise true in the case of the officer, they must, in his case, not be the object, but the result of his activity. To be an officer is to assume an apostleship—if such a thing exists.

The individual who becomes a professional officer must always be ready, at any time, to make the supreme sacrifice for his country, both in war and in peace, without argument. He must stop to measure all the duties which he will assume relative to the youth confided to his care or the country over which he watches. He must become an officer as others would become a priest or a doctor—that is, not out of consideration for personal benefits but for the fulfillment of the highest, the noblest, and the most magnificent mission. If he does not fulfill these requirements, there is no place for him in the Army.

The entire nation must understand that this is the officer's conception of his task, and that the respect of all is thus due him. He must render himself worthy of this respect by the manner in which he fulfills all his missions, even the most modest. The professional officer feels that his is an ideal profession, and gives himself to it body and soul for his entire lifetime.

Submarines in the Battle of Leyte Gulf

Translated and digested by the MILITARY REVIEW from an article by Captain Lepotier (Navy) in "La Revue Maritime" (France) March 1949.

IN LANDING at Leyte in the very center of the Philippines and 500 miles beyond the positions previously conquered, the Americans could only count on carrier-borne aviation and submarines for protection against probable intervention by the Japanese Fleet.

To meet the threat of the thousand Japanese airplanes based on 70 airfields in the Philippines, to provide an aerial cover for the Third and Seventh Fleets, and to support the landing operation, 32 American carriers were forced to remain concentrated to the east of Leyte.

Thus, the zone regularly reconnoitered by the carrier-borne aviation (with a mean radius of 300 miles) extended to the west of the Philippines along a line passing through the western extremity of Mindanao, the northern tip of Palawan, and about 50 miles beyond the west coast of Luzon. East of Luzon, aerial reconnaissance hardly extended beyond a line parallel with the Island's northern extremity (see Figure 1).

Beyond these limits, security was the responsibility of a large group of submarines. There were as many as 70 submarines scattered over the sea at the time of the battle. The different posts were occupied either by isolated submarines or by groups of two or three operating together. The zones of permanent surveillance included the waters off such enemy-held places as Singapore, Cape Saint Jacques, Hainan, Manila, Formosa, and the interior sea. In addition, the submarines guarded the passages that the Japanese forces would be forced to use in attempting to approach the American landing zone, especially the straits leading into the seas of the interior of the Philippines. These included the Strait of Macassar, the

strait between Palawan and the banks of the China Sea, and between those banks and Cape Padaran (Figure 1).

The submarines operating south and west of the Philippines were based on the northwest coast of Australia, and their cruises lasted about 50 days. The mission of every isolated submarine or of each group was, first, to report the location of enemy forces sighted, and, afterward, to attack them.

A Typical Operation

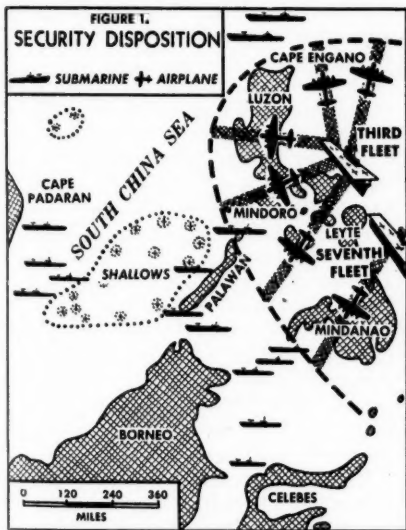
One group, composed of the submarines *Darter* and *Dace*, left Australia on 3 October 1944, with the mission of taking Palawan passage under observation. It arrived on the 10th. Leaving the *Dace* at the south entrance of the passage, the group chief took charge of the north entrance. At dawn, a few days later, the *Dace* sighted a convoy. It was not able to overtake the convoy during the day, but it maintained contact while heading south. The pursuit was continued on the surface during the night, and the submarine came up to the convoy near the north coast of Borneo. The *Dace* torpedoed and sank a tanker and a transport. The submarine had to remain deeply submerged all the following day to elude the Japanese, and it was not able to begin the return journey to its post until the following night.

At daybreak on 19 October, the two submarines were communicating with each other by voice in the usual manner when the lookout on the *Dace* sighted the top of a mast. The crew of the *Darter* sighted it at almost the same time. Without a signal, the two vessels submerged and moved away from one another. Soon the object of the alert was identified. It was a patrol of

two Japanese torpedo boats of the *Fubuki* type. One of the torpedo boats passed between the two submarines. The *Darter* discharged a volley of torpedoes, but the torpedo boat caught sight of their wakes in time, and avoided them exactly at the moment when the third torpedo from the *Dace* was leaving its tube.

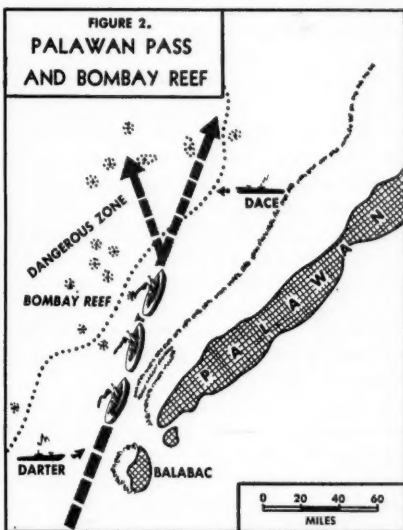
The commander of the *Dace*, who wondered why the target had escaped exactly at the moment he fired, discovered why the following night when he visited the *Darter* and the two commanders compared the ex-

patrol on the surface. A little past midnight, the *Dace* received a radio message from the *Darter* indicating fast boats moving northeast. That night, the *Dace* was at the northern end of the passage and, therefore, in good position to pursue the objectives reported by the other submarine (Figure 2). The latter attempted to maintain contact, but found itself being gradually outdistanced by the Japanese, who proceeded on a course of 20°, at a speed of 20 knots. The *Dace's* pursuit route was then calculated to intercept the



act time of their shots. With this protective maneuver, the Japanese vessel had begun its pursuit, together with the other torpedo boat. But the Japanese had not been able to discover the submarines, which had submerged to maximum depth.

A convoy, and particularly a torpedo-boat patrol, indicated activity by the main body of Japanese forces. For this reason, the submarines redoubled their vigilance. The 20th and 21st passed, however, without anything occurring. When night had fallen on the 21st, the *Dace* resumed its



enemy at dawn, but the commander saw that his course would cause him to enter the shoal zone of which he did not possess a detailed chart. This caused him to doubt the enemy's intention of maintaining this course (Figure 2).

Without further information from the *Darter*, the *Dace* continued its pursuit on the basis of its initial information. At dawn, nothing was in sight. Soon a message from the *Darter* indicated that the enemy had changed his course during the night and had outdistanced the American

submarine. It was now too late for the *Dace* to establish contact. The *Darter*, however, had been able to learn that the Japanese force consisted of three cruisers, which confirmed the fact of growing activity by the Japanese.

Radar Proves Valuable

During daylight on 22 October, air reconnaissance was unable to find any trace of the three Japanese vessels. This was supposed to be the last day of patrol for the *Dace* and *Darter*, but at noon they picked up a message reporting a convoy en route for the Palawan passage and decided to wait for it. At midnight, the submarines were on the surface when the *Darter's* radar operator reported an echo at maximum distance. The commander of the *Dace* soon determined that the radar had picked up a group of large ships, moving in two parallel columns.

The submarine commander gave the order to maintain radar contact and to remain on the surface in attack position. The *Darter* was on the port side and in front of the left column; the *Dace* was on the starboard side and in front of the right column (Figure 3).

In order to be able to give the American command accurate information about the ships that had been detected, the submarine commander's intention was to maintain contact until dawn and not to attack until he had seen the Japanese in daylight, despite the additional risks that would be incurred in attacking at that time.

The two American submarines thus found themselves facing the main Japanese squadron of Admiral Kurita, composed of five line vessels. Two of the vessels were the largest battleships ever to be launched, the 75,000-ton *Yamato* and *Musashi*. The other battleships were the *Nagato*, the *Kongo*, and the *Haruna*. There were also 10 armored cruisers: the flagship *Atago*, the *Maya*, the *Takao*, and the

Chokai of the 4th Division; the 5th Division comprising the *Myoko* and the *Naguro*; the 7th Division consisting of the *Kumano*, the *Suzuga*, the *Tone*, and the *Chikuma*. In addition, the fleet contained the light cruisers *Noshiro* and *Yahagi*, and 15 destroyers.

Until dawn, the two submarine crews contemplated this target, unique in the history of submarine warfare. As the sky grew light in the east, the two submarines submerged. With their eyes riveted to their periscopes, the two commanders shortly saw silhouetted against the dawn the two columns of Japanese ships.

At 0532, the commander of the *Darter* fired 10 torpedoes from his forward tubes at the leading armored cruiser of the left column. Then he put the rudder hard over to the left to fire from the rear tubes at the second cruiser in the column. While he was firing this second volley, he was able to count five explosions against the first target and saw it go down in a cloud of flames and smoke. Four explosions were heard against the second target, but the commander did not have time to verify the result through his periscope before he submerged (Figure 4).

The commander of the *Dace* saw the two large vessels on fire and the other vessels circling and firing wildly.

The *Dace's* own objectives were now approaching. The submarine let the first two vessels pass and then fired six torpedoes from the forward tubes at the third, which the commander took to be a battleship but which later proved to be only an armored cruiser. On board the submarine, four explosions were heard against the target, and the commander immediately ordered a deep dive.

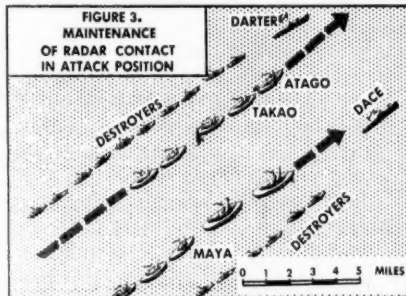
The *Darter* had sunk the armored cruiser, *Atago*, the flagship, and had seriously damaged the *Takao*. The *Dace* had just sunk the armored cruiser *Maya* with a large part of its crew (Figure 4). Admiral Kurita and a few other survivors of

the *Atago* were picked up by the torpedo-boat *Kishinawi* and the Admiral transferred his flag to the *Yamato*. Kurita lost a large part of his staff, particularly communications personnel, which affected adversely the functioning of his control room during the main battle fought later.

The two submarines were furiously attacked with depth bombs by the torpedo boats but suffered no serious damage. When this action was over, they cautiously returned to periscope depth, then surfaced, and started for the scene of the torpedoings. In a short time, they sighted masts and recognized a large vessel, the *Takao*, standing still but protected by two destroyers and two planes. During the day, the *Takao* succeeded in getting under way

not be refloated, it was necessary to evacuate the crew and try to destroy the grounded vessel before dawn. The current did not permit employing small boats in taking off the stranded crew, so a line was rigged between the two submarines. By hauling themselves along this rope, the 80 men of the *Darter* succeeded in reaching the *Dace*. That task lasted from 0200 to 0440.

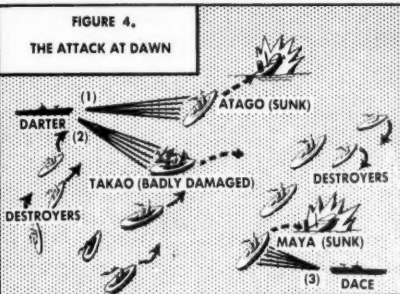
The *Dace* now withdrew to a safe distance to wait for the explosion of the scuttling charges, but this did not occur for some unknown reason. Daybreak was very close, and there was not a second to lose. The *Dace* fired two torpedoes at the derelict, but they exploded on the reef. It fired its last two torpedoes along the axis of



toward the south at a speed of 6 knots. The submarine maintained contact with the group, intending to finish off the *Takao* at night. As soon as darkness fell, the submarines surfaced again and sought attack positions by radar at a speed of 18 knots.

A Sub Lost

It was then that the *Dace* received a message from the *Darter* that it had grounded. The *Darter* had run at full speed onto the dangerous Bombay Reef in the west half of the Palawan passage (Figure 2). Faced with the alternatives of finishing off the enemy vessel or saving the *Darter* crew, the commander of the *Dace* chose the second. An hour later, he reached the *Darter*. Since the *Darter* could



the *Darter* with the idea of striking it in the stern, which must have been hanging over the reef. It was 0510, and dawn was breaking.

In spite of the danger of being sighted on the surface by enemy planes, the deck gun was ordered loaded. Scarcely had the first shots struck the derelict when the radar operator reported the echo of a plane about 6 miles away. It was necessary to make a quick dive. The Japanese aviator, seeing that one of the two submarines sighted had remained on the surface, aimed his bomb at it, but the bomb also missed.

It was evident that the Japanese plane would call surface vessels to the rescue, so the commander of the *Dace* waited to

see what was going to happen. Having no more torpedoes, he took up position west of the derelict, supposing that the enemy would come from the east. A torpedo boat did show up from this direction and cautiously approached the *Darter*, evidently sending a party aboard the derelict. The torpedo boat then withdrew.

The two American commanders decided to send a demolition party to the *Darter* the following night. As the *Dace* was approaching on the surface to execute this project, however, the ASDIC listener reported a very clear submarine echo. In the face of this new danger, the two commanders decided to leave the area as quickly as possible, since it was becoming increasingly dangerous for the 165 men crowded on board the *Dace*. Eleven days later the *Dace* reached Australia.

Other Engagements

While the *Darter* and the *Dace* were maintaining radar contact with the forward portion of Admiral Kurita's squadron during the night of 22-23 October, the submarine *Bream*, on patrol duty off the entrance to Manila Bay, picked up a group of war vessels. These included a heavy cruiser, a light cruiser, and two destroyers. The commander maneuvered into an attack position a few hundred yards from the line and, at 0325, fired six torpedoes at the leading vessel. One of them damaged the cruiser *Aoba*.

The following evening, the submarines *Angler* and *Guitarro*, which were on patrol duty in the straits north of Palawan, established radar contact with Admiral Kurita's squadron. They were unable to get close enough to attack it, but they kept contact from the rear long enough to be able to report that the squadron was entering Mindoro Strait, the shortest route to San Bernadino Strait and the Gulf of Leyte.

The American submarine screen had worked perfectly. The alert of the night of

22-23 October had given the American command a 48-hour advance warning. The information from the *Angler* and the *Guitarro* defined the intentions of the enemy and indicated that by dawn the Japanese would be within reach of American planes. Moreover, the *Darter* and the *Dace* had sunk 3 of the 15 large armored vessels in the main Japanese force.

In order to avoid mistakes, American submarines were ordered to remain outside the zone of action of the American air and surface forces which were to go into action alternately against the enemy forces on 24-25 October. On the other hand, the submarine force commander attempted to dispose the maximum number of submarines along the possible retreat routes of the Japanese. This order affected 70 submarines. Those already at sea were regrouped: seven in the Luzon Strait, and three north and one northwest of Formosa.

At the same time, two new submarine "Task Groups" were ordered to head west at top speed to the area north of Luzon.

The first group consisted of the submarines *Haddock*, *Halibut*, and *Tuna*.

The second group was composed of the submarines *Atule*, *Jalleo*, and *Pintado*.

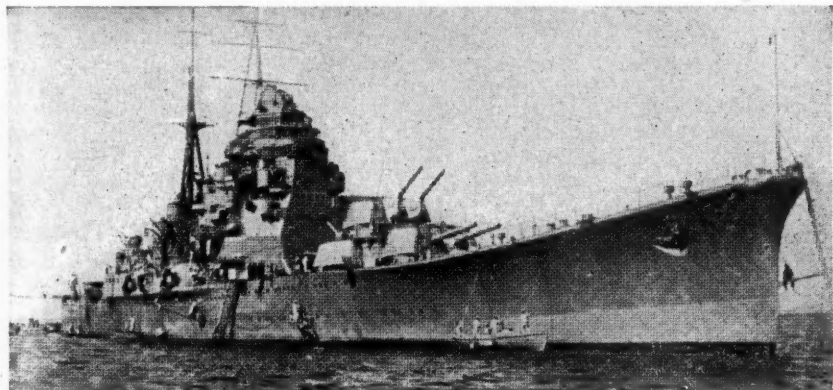
On the afternoon of 25 October, the first group, which was in the lead, began to hear the explosions of the battle of Cape Engano waged by the planes of the Third Fleet against the Japanese squadron under Admiral Ozawa. During the afternoon of the 25th, Ozawa lost the last four available Japanese airplane carriers: the *Zuikaku*, the *Chitose*, the *Chiyoda*, and the *Zuiho*. These vessels were being used as bait to draw the American Third Fleet northward, thus permitting Admiral Kurita's squadron, which was coming out of San Bernadino Strait, to reach the Gulf of Leyte. As the submarine groups approached at full speed, Admiral Ozawa's squadron was retreating with its two battleship-carriers, *Ise* and *Hyuga*; the light

cruisers, *Oyodo*, *Tama*, and *Izuzu*; and about 10 destroyers. After the loss of the *Zuikaku*, Admiral Ozawa had transferred his flag to the *Oyodo*.

The commanders of the first submarine group were soon able to follow the last phases of the air-naval battle by picking up the radio conversations of the American pilots as they reported their attacks and their results. About this time, the commander of the *Halibut* sighted the tower of a Japanese cruiser, about 15 miles away. He gave chase until he caught sight of escorting vessels, and he then submerged

A few miles away, the commander of the *Haddock* saw the flashes of the guns and the illuminating shells of American cruisers which were firing on a light cruiser and two destroyers of the Ozawa rear guard. He decided not to mix in this *melée* as long as the American forces were still engaged, but to attempt, afterward, to place himself on the route of the retreating enemy. But the Japanese vessels passed out of range.

The second submarine group, about 60 miles away to the northeast, received regularly the reports from the first group and



The Japanese armored cruiser *Atago*, above, was the flagship of the main Jap Fleet heading for the island of Leyte. It was sunk by the American submarine, *Darter*.

for the attack. At 1843, he fired six torpedoes from his forward tubes at a distance of 3,600 yards. On board the submarine, five successive explosions were heard, and then only the sound of the propellers of the escorting vessels. The latter stopped every now and then as if they were picking up survivors. No depth bombs were fired. The *Halibut* surfaced at 1950, and thought it saw, in the reflection of the moon on the water, an enormous capsized hull go down. Later information showed, however, that no Japanese vessel was sunk by the *Halibut* in this attack.

maneuvered to intercept the enemy farther north. The *Jalleo* obtained two echoes on its radar. It called on the *Pintado* to join it, and submerged to periscope depth at 2242. In the reflection of the moon, it was able to identify a light cruiser a short distance away, and fired three torpedoes from its forward tubes at a distance of 1,200 yards. None of the torpedoes struck the target. The submarine promptly turned about to port and at 2305 fired four torpedoes from its rear tubes at 700 yards. This time, it was able to see in the periscope an explosion midway of the beam

of the target, another even with the forward mast, and a third between the bow and the bridge. The *Jalleo* submerged deeply to reload its tubes, but the *Pintado*, which was seeking a firing position, saw the target go down. The vessel was the light cruiser *Tama*.

This was the last action by American submarines against the Japanese vessels which participated in the Battle of Leyte Gulf. This battle decisively settled the problem of naval supremacy and assisted in bringing a rapid end to the War in the Pacific.

Summary

We see here the most classic application of the role of submarines in co-ordination with surface forces: long-range security of friendly forces outside the latter's zone of action and the attack of reported enemy forces either during the approach or retreat. The independent command of submarine forces in the theater, as well as the flexibility of organization, permitted the submarines to operate singly, in sections, or in divisions. This

flexibility was due to the excellence of both surface and underwater liaison and detection means.

It should not be forgotten, however, that the greatest reason for the success of American submarines in this operation was due to the enemy's inferiority with respect to detection. If the Japanese had possessed radar equipment as good as that of their adversaries, the prolonged surface contacts such as that by the *Darter* would not have been possible. German submarine commanders in the Atlantic learned this lesson from the moment Allied escorting vessels possessed good radar sets. Similarly, if the Japanese torpedo boats had been equipped with efficient ASDICs, the submarine attacks at a distance of a few hundred yards would not have been so easy, and it is probable that the submarines would have encountered more accurate and deadly pursuit.

It must be noted, however, that the Americans knew exactly how to take advantage of their technical supremacy in conducting their operations.

Behind the Old Iron Curtain

Digested by the MILITARY REVIEW from an article by Brigadier General Sir James E. Edmonds in "The Army Quarterly" (Great Britain) April 1950.

THE Russian iron curtain is no new thing. Before the communist regime, it had gaps in it, perhaps, but behind it was a deep police entanglement. Napoleon knew of its existence, for his intelligence agents, as he complained, were not able to collect for him any information about the country behind it, nor about her armed forces. It was certainly in existence when I first visited Russia on my own in 1891, and it continued to 1914. Lengthy and tiresome formalities took place then on entering the country, whether by the land frontier or by one of the ports. It must be remembered that in those days it was only in Russia

and Turkey that a passport was demanded of anyone in Europe, although a watch was kept, even at British ports, for certain international anarchists.

Having been permitted to enter, no one could get a bed anywhere—except in a *maison tolérée*—without producing a passport. Every hotel had its passport office, and every block of flats its *dvornik* who held the passports of its inmates. Foreign language students were admitted, but they had to live in certain specified localities, the British in Moscow. The Germans and Australians were exiled to remote small

towns on the Volga, inaccessible by railway.

The passport business was by no means all that happened. On every visit, I was persistently watched and followed. On the morning after my arrival, a gentleman would appear in my bedroom and offer his services as a guide, and, I had been duly warned, it was as well to accept. In compensation, he obtained anything that I wanted to buy much cheaper than I could, and he showed me many things that I otherwise should not have seen. When I traveled by train he left me; but some other Russian was sure to enter my compartment and open conversation, often in English, to find out what I was about.

Without Russian escort, it was indeed difficult to move about very much. The ubiquitous police stopped any stranger and asked questions. In all sorts of odd places, one found sentries and guard rooms; on the country roads and along the frontier there were Cossack patrols who would rob you as soon as look at you. But nowhere did I find, not even in the Imperial palaces, the elaborate system of signals and red and green lights which, according to General Bedell Smith, helps to guard the approaches to Stalin. But bribery, by quite small sums, which in the old days would get you almost anything and anywhere, is now said to be dangerous to attempt. In 1891, I attended a review by the Czar by purchasing a pass for J. J. Ivanov for two rubles from a field gendarme.

I went to Russia in August 1891, during the 2 months' vacation of the Royal Military Academy, Woolwich, where I was an instructor in fortification, in order to study up on the language for the Staff College entrance examination.

My application to travel abroad passed through the Intelligence Division, with the result that I was given a mission. It had been brought to the notice of the Prime Minister, Lord Salisbury, that while Russian officers on leave in England

were permitted to visit the military factories, training ground, and anything else in which they were interested, British officers in Russia were refused access to anything of a naval or military nature. He demanded reciprocity, threatening that otherwise facilities would be withdrawn by this country.

The Russian Foreign Minister, Count Schuvalov I think his name was, agreed, and Intelligence made out a list of establishments to be visited: the Obukuv and Putilov arsenals; the Tula rifle factory, the Rembatovo artillery practice ground, where it was believed a new weapon, a field howitzer, was being tried; and the service schools and minor establishments, for appearance's sake. I was to go as a test case.

The point which I have to make is that though technically the Russians did not break their word, they did their best to evade fulfilling their engagement. They had evidently learned that I had only 2 months' leave, for by the time I was due to return home, no permits had been received. The acting ambassador, Sir Henry Howard, arranged for an extension of my leave, but bade me pack up and take a train for Warsaw where he had a job for me. I had no sooner started than the permits arrived at the Embassy, and I was instructed to return.

At the establishments themselves, I was treated with the greatest courtesy. I did pick up what was considered a valuable piece of information. At Tula, the manufacture of a magazine rifle had just been commenced. The Czar had for some time opposed its introduction, as his infantry, he thought, were too stupid to be trusted with such a complicated weapon. Our experts were of the opinion that Russia would keep the peace for at least 5 years, as the rifles had to be manufactured and the men taught their use.

On the security side, one incident of my trip is of interest. After visiting the

artillery practice ground at Rembatovo, I was waiting at the little railway station to take the train. Up and down the line, I could see double sentry posts about 50 yards apart. Suddenly, the people at the station were ordered to leave it, go a couple of hundred yards down a crossroad, and look the other way; the Czar was about to pass through. Then came three blue trains, all exactly alike. No one could tell in which of them the Czar was traveling. Stalin is said to have a dozen or more black armored cars, all alike, and bearing as a rule no identification number.

The precautions in the Czarist days were directed against Nihilists, as they were called, who, in spite of all the precautions, had blown up Alexander II. The present "royal family of the Kremlin," well knowing that a small party of determined enthusiasts can upset a great and majority-approved government, must realize how uncertain is their hold on power. It was a truly parental government, but the people had more say in it than in a totalitarian or police state.

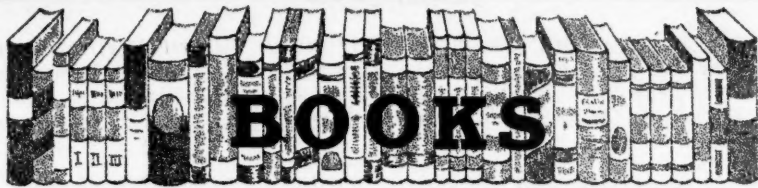
Here are some of the benefits enjoyed under the czars. Free education was given to selected boys of the lower, peasant classes. A state medical service was provided. Every village, if it had not a quali-

fied doctor, had a *veltscherr*, who could set a limb or prescribe a pill from a numbered box, like a sea captain of the old days. State orphanages cared for unwanted children; an identification mark was assigned the infant, which enabled its parents to claim it at a later date. Otherwise, girls were educated and trained for the ballet, for nursing, or in the arts. Nearly all the boys were trained to be NCOs of the Army. Ridiculously cheap meals were available in the towns, in what we should call broken-meat markets, the food being laid out, ready on plates, at 5 or 10 kopeks. There was no income tax.

To show the care that the police took of the public: as one left a station he did not have to stand in a queue, but was asked whether he wanted a cab and what kind. One night, after being at the opera in Petrograd, as the moon was bright, Colonel (the present General Sir Aylmer) Haldane and I started to walk home. We were soon halted by a policeman who asked what we were about. I said that we were going to our hotel. "On foot?" he asked, and on my reply, said, "It is not safe, there are bad men about." He called up a *droshky*, bargained for the fare (the usual procedure) and put us into it. I never again had such a cheap ride.

In a free democracy such as ours, we do not focus the interest of our citizen by force upon national problems. Instead, we place our dependence upon the greater strength of voluntary and spontaneous interest of our citizens.

General J. Lawton Collins



FOR THE MILITARY READER

THE LORRAINE CAMPAIGN. By Dr. Hugh M. Cole. From the series, *The United States Army in World War II*. 657 Pages. Illustrated; 67 photographs and 51 maps. US Government Printing Office, Washington, D.C. \$10.00.

Based on official American and German records, *The Lorraine Campaign* is the story of the operations of General George S. Patton's Third Army in the fall of 1944 against the German forces defending the territory between the Moselle River and the Siegfried Line. From the seemingly inexhaustible aspects of the campaign narrated in this volume, no one can fail to see what the soldier's war was like.

The narrative begins with the situation on 1 September 1944, when the Third US Army had just completed one of the most successful operations in modern military history. Flushed with the successes rolled up during the pursuit, the armored and infantry divisions of General Patton's Army entered upon operations in Lorraine with an extraordinary spirit of optimism. This optimism began to vanish, however, during the first days of the campaign when a gasoline drought struck and left Patton's mobile columns paralyzed.

Fortunately, during this paralysis, the enemy was in no position to counterattack; unfortunately, however, this brief lull in operations gave the German forces an opportunity to recuperate. By the time Third Army was able to resume operations, it encountered a revitalized German force under orders from Hitler to "stand and hold."

The operations that followed became characteristic of the fighting in the 3½-month campaign in Lorraine and, in contrast to the pursuit pace of earlier operations, followed the "punch and probe" technique.

Villages and fortresses in the path of advance had to be assaulted with frontal and bludgeoning tactics that slowed movement down to an "infantry pace." Snow, rain, cold, fog, overcast, and mud conspired to hamper the American advance, which sometimes seemed unbearably slow to those who took part. Directly in the path of Third Army also lay the redoubtable fortress of Metz, the Maginot Line, and the Siegfried Line, and an enemy whose tenacity increased with each American advance on German soil.

When the campaign ended on 18 December, the Third Army had wrested from the enemy 5,000 square miles of territory and denied the Germans the use of the Saar industrial region. Although the campaign lacked the dash and brilliant successes of earlier Third Army operations, it gained a new reputation for Patton's Army. Its ability to fight a foot-slogging battle, punch its way across heavily defended river lines, and to fight pitched tank battles was to stand Third Army in good stead when it intervened in the Ardennes.

Readers of the *MILITARY REVIEW* will recognize portions of Chapter VIII which appeared in the May 1950 issue as an article by Dr. Cole under the title of "The Moselle River Crossing of the 90th Division."

THE EFFECTS OF ATOMIC WEAPONS. Prepared by The Atomic Energy Commission and The Department of National Defense. 456 Pages. Combat Forces Press, Washington, D.C. \$3.00.

"... The purpose of this book is to provide the essential scientific and technical information that will permit the necessary plans to be made for dealing with the new and unusual situations that would arise as the result of the explosion of an atomic bomb."

"It will be evident . . . that adequate protection against the effects of an atomic bomb attack will require very comprehensive and detailed planning. Such planning will be necessary to avoid panic, for mass hysteria could convert a minor incident into a major disaster."

The foregoing quotations from *The Effects of Atomic Weapons* indicate clearly the *raison d'être* for this volume. To keep strong, to allay fear, we must have definite knowledge of what will happen to us, our crops, our cities, if an atomic bomb is exploded—and to prepare for such contingencies as might arise.

Beginning with the principles of an atomic explosion, the text covers such vital subjects as shock from atomic air, underwater, and underground bursts, and the physical damage resulting therefrom; the effects of thermal and nuclear radiation; and residual nuclear radiations and contamination. Decontamination procedures are discussed; and finally, the effects of this new weapon of great destructive power on people, together with methods of how best to protect our population are delineated.

Compiled by a selected group of distinguished scientists, amply annotated and indexed, the language of this book is understandable to the layman. It should help stimulate informed, positive action. This volume is identical with the edition officially published by the government of the United States.

THEORY OF MULTIPLE FIRE. By Dr. Hans Brändli. 198 Pages. Birkhäuser Publishers, Basel, Switzerland.

In this book, printed in German, the author outlines the technical aspects of antiaircraft artillery fire when operating with time or impact fuzes and with many guns firing. The problem of multiple fire is given a thoroughgoing theoretical treatment, which is of great value in the construction and use of multiple weapons, whether they be rocket launchers or cannon. Many of the problems encountered in the improvement of antiaircraft artillery are thoroughly discussed and possible solutions presented.

THE COMING DEFEAT OF COMMUNISM. By James Burnham. 278 Pages. The John Day Company, New York. \$3.50.

ROOF OF THE WORLD: Tibet, Key to Asia. By Amaury de Riencourt. 322 Pages. Rinehart & Co., New York. \$3.50.

NELSON THE SAILOR. By Capt. Russell Grenfell. Illustrated. 235 Pages. The Macmillan Company, New York. \$3.00.

MERCHANT SHIPS: 1949-50. Edited by E. C. Talbot-Booth. 260 Pages. McGraw-Hill Book Company, New York. \$8.50.

THE VIRGIN LAND: The American West as Symbol and Myth. By Henry Nash Smith. 305 Pages. Harvard University Press, Cambridge, Mass. \$4.50.

PORTSMOUTH POINT: The British Navy in Fiction, 1793-1815. By C. Northcote Parkinson. 154 Pages. Harvard University Press, Cambridge, Mass. \$3.00.

SCIENTIFIC RESEARCH: ITS ADMINISTRATION AND ORGANIZATION. Edited by George P. Bush and Lowell H. Hattery. American University Press, Washington, D. C. \$3.25.

A symposium.